

Apple's Open Collaboration Environment

System 7 extensions promise simplified communications for workgroups. **See page 53**

10Base-T LAN adapters for workstations

The Test Center puts 13 network interface cards through their paces. **See page 66**

MAY 31, 1993

THE VOICE OF PERSONAL COMPUTING IN THE ENTERPRISE

VOLUME 15, ISSUE 22

Short circuit in IBM laptop prompts recall

By Ed Scannell

IBM's got a hot little laptop that is generating more heat than the company would like.

The IBM Personal Computer Co. last week issued a recall of some 150,000 of its Personal System/2 L40SX laptops based on reports that a small number of them have short-circuited.

In a handful of cases, when a system's insulation has been cracked or damaged, the short circuit has burned a hole in the machine's plastic casing. In most cases, however, the machine's circuitry and software was damaged or destroyed, officials said.

Only 15 incidents have been reported, all from Europe; none so far has been reported from the United States or Canada, and none involved injuries, an IBM representative said.

See RECALL, page 97

NT keeps client/server apps waiting

Database servers will be ready as soon as Microsoft ships delayed OS

By Scott Mace

ATLANTA — A traffic jam of client/server vendors is growing behind the drawn-out shipment of Windows NT, with frustrated users in tow.

As key pieces such as Advanced Server are still at least 90 days away, vendors at the huge NT booth here have pinned their ship dates on NT's release. Many have also intensified their beta testing and performance tuning after finding NT to be larger and slower than expected.

Many corporate users are eager to get started on their own application development. "A lot of people would love to deploy client/server applications on NT, but they are precluded from doing so until Microsoft ships," said John Tarbox, CEO of Canaan Analytics, a New Castle, Del. consulting firm.

Once NT ships, first out of the

COMDEX Windows World Coverage continues...

see pages 3, 6, 13, 17, 23, 25, 29, 30, 42.

chute will be Windows NT versions of many popular database servers (see chart on page 97).

Several client/server vendors, including Informix Software Inc. and Mozart Systems Corp., are delaying release of NT products at least until NT Advanced Server ships. Many others are closely tying their ship dates to the shipment of NT itself.

When each database server ships for NT, libraries to allow NT clients to connect to those servers are also due to ship, Windows World exhibitors said.

The NT world according to Microsoft

Microsoft brought NT into the world at Comdex last week, releasing the latest information about the platform

Product	Shipping	Price
Windows NT (desktop version)	By July 22	\$495; \$295 upgrades
Windows NT Advanced Server	By Aug. 21	\$2,995; \$1,495 for six months
SQL Server for NT	Q3*	\$995 to \$14,995**
SNA Server for NT	Q3	\$1,495 to \$5,995**

*60 days after NT ships. **Pricing based on number of users.



Gates: 3,000 NT applications due in the next six to 12 months

Because many customers' early NT applications will be modest in size and scope, companies such as Informix are tailoring initial releases only for smaller applications and developers.

Informix will release Informix-SE for NT for smaller LANs, but the company's flagship Informix-OnLine database server is available.

See NT, page 97

cc:Mail for Windows upgrade to deliver rules-based routing

By Cheryl Gerber

ATLANTA — Amid pressure from an increasingly competitive messaging market, Lotus Development Corp. will release two of its most strategic products starting next month — cc:Mail for Windows 2.0 and cc:Mail Wireless.

Lotus previewed an array of cc:Mail for Windows 2.0 features at spring Comdex last week, including a redesigned user interface, the use of rules with approximately 20

customization options, an improved text editor, and support for Microsoft Corp.'s Object Linking and Embedding.

The company also confirmed that it is developing a native X.400 Message Transfer Agent. **See CC:MAIL, page 97**



cc:Mail for Windows 2.0 adds customizable rules-based mail processing and a new GUI.

IBM may initially ship PC DOS 6 without data compression utility

Big Blue wants time to ensure safety, OS/2 compatibility

By Ed Scannell

ATLANTA — IBM's personal software products division (PSP) may release PC DOS 6.0 in late June without a data compression utility, although a version issued shortly after would include such a feature.

Trying to sidestep the difficulties Microsoft Corp. has had with the DoubleSpace utility built into MS-DOS 6.0, IBM officials said here last week they are not about to make a quick decision about which compression technology to use.

"We are taking a little more

time because we want to be as safe as possible," said Martin Hewitt, the brand manager for PC DOS 6.0. The product was shown at spring Comdex last week.

Another reason IBM is not ready to commit to a compression utility is **See PC DOS, page 97**

Apple, HP raise the curtain on portable communicators

By Yvonne Lee and Tom Quinlan

Portable communicators from Apple Computer Inc. and Hewlett-Packard Co. will materialize within a week, as Newton and OmniBook 300 formally debut.

At the Consumer Electronics Show in Chicago this week, Apple will introduce its Newton personal digital assistant with pricing, distribution plans, and a list of services it intends to provide for three versions of the hand-held device. The products

will ship in July.

The Newton family will range in price from \$699 to \$1,250, sources said, with a variety of services and connectivity devices determining the price.

At the low end will be a stripped-down version that does not include a modem or any free connectivity to AppleLink.

The midrange system, expected to cost around \$900, will include a PCMCIA-based radio. **See PORTABLE, page 97**

The first

**NEW IDEA IN
BUSINESS
COMMUNICATIONS
SINCE E-MAIL.**

This One



ZXHH-W1J-8G78

filed, where it's routed after it leaves your desk. You can accept or reject meeting requests, of course, but you can also delegate them. You or your proxy can check for conflicts on any number of personal calendars across any number of networks — even across dissimilar computer operating systems — with a single keystroke.

Your incoming mail can be automatically sorted and forwarded to the appropriate people when you're out of town, or you can handle it yourself from your laptop. And WordPerfect Office features the only electronic Out



ING SYSTEM.

Box in the industry, so you can check the status of any message or project at a glance (as well as retract and rethink any unopened messages).

Even forms can be routed electronically.

WordPerfect InForms™, an electronic forms package included with WordPerfect Office,* can take most of the



work — and all of the paper — out of routine office paperwork. Now you can sign off on timesheets, invoices and other business forms electronically and send them up the line for approval, or distribute them anywhere in your organization instantly (including to virtually any desktop or SQL database).

Simplified administration across platforms.

To bring the unique benefits of the corporate operating system to as many companies as possible, we developed WordPerfect Office for LANs of as few as five users and WANs of as many as 100,000. And as you'd expect from any WordPerfect product, it's a highly capable cross-platform package, supporting communications on Windows, DOS, Macintosh, UNIX, OS/2 and VAX/VMS.

For connections to existing e-mail systems and communication between dissimilar systems, WordPerfect offers a long list of gateways, including Novell MHS, IBM PROFS and OfficeVision/VM, SNADS, X.400, SMTP, MCI Mail, AT&T EasyLink and FAX. Perhaps most



importantly, the program supports full directory services to greatly simplify the sharing of names between systems. And we offer diagnostic and management services to make configuring, monitoring and maintaining your system easier.

A new standard in electronic messaging.

By integrating e-mail, calendaring, scheduling, task management and workflow management into a single, powerful workgroup application, WordPerfect Office has raised the industry standard. But because it's as easy to learn as the e-mail you may be using now, it can greatly increase user productivity with little additional training.

Before you buy or upgrade any e-mail system, you have to see what the first corporate operating system can do. To arrange for a demonstration or free evaluation of WordPerfect Office 4.0, call us at (800) 526-5052.

WORDPERFECT IS A REGISTERED TRADEMARK AND WORDPERFECT OFFICE IS A TRADEMARK OF WORDPERFECT CORPORATION. OTHER THE UNITED STATES AND OTHER COUNTRIES. ALL OTHER BRAND AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES. ©WORDPERFECT CORPORATION 1995. *FOR A LIMITED TIME ONLY.

WordPerfect

Introducing WordPerfect® Office 4.0.

You know how companies operate. Large or small, local or global, they operate on meetings. Memos. Deadlines. And paperwork, paperwork, paperwork.

If you've ever had to make ten calls to get four people in the same room at the same time, or wait three days for a purchase order from the eighth floor, you know how well the system usually works.



but meetings, appointments, tasks and paperwork — all the basic, relentless stuff of business. It automates the flow of work and information through (and throughout) your company.

WordPerfect Office is the first comprehensive calendaring, scheduling and task management program to be integrated with a best-of-breed



CORPORATE OPERAT

But now there's a new system — a single, cross-platform workgroup application that can handle all your internal business operations and communications electronically. It's WordPerfect® Office™ 4.0, the first "operating system" for companies.



E-mail isn't enough anymore.

Organizations still driven by the telephone and the mail cart may see e-mail as the next logical step. But WordPerfect has now advanced the technology of e-mail to a higher level. WordPerfect Office "mail enables" not just messages,

e-mail engine. There's nothing else like it available today, and perhaps surprisingly, it's available for the cost of e-mail alone.

You make the rules.

WordPerfect Office works the way your office works. You control how information reaches you, where it's





**IF YOU HAVE QUESTIONS
ABOUT THESE PROGRAMS,**



THIS PROGRAM CAN HELP.

INTRODUCING OUR CERTIFIED PERFECT PARTNER PROGRAM. Whether you're looking for evaluation software, technical service, system planning and design, or you're upgrading your system from WordPerfect® Office 3.1, our partners are ready to help. Both on the phone and on-site. In addition to having outstanding expertise and service history, each partner has been specially trained and certified to provide a new, more comprehensive level of WordPerfect support and service. So your office can run smoother, faster and better today. Call 1-800-526-5176 to find the partner—and help—nearest you.

WordPerfect®

CERTIFIED PERFECT PARTNERS

**Allied Data Communication Group, Inc.
Applied Computer Technology**

The Asset Group

**Automation Partners
Barrister Information Systems Corp.**

CGI Group

**Data Systems Network
DCT Systems**

EDS

**Evernet Systems, Inc.
The Future Now**

LANSystems, Inc.

**Syntrex Technologies, Inc.
USConnect, Inc.**

NEWS

Four firms buy in to Kaleida's ScriptX alliance

BY TOM QUINLAN

Four Japanese conglomerates became charter members of Kaleida Labs Inc.'s newly announced Manufacturer's Alliance last week, guaranteeing them advance looks at ScriptX and first crack at adapting the technology to specific consumer products.

In addition to Kaleida co-founders Apple Computer Inc. and IBM, Hitachi Ltd., Toshiba Corp., Mitsubishi Electric Corp. and Creative Technology Ltd. paid an undisclosed sum to become charter members of the Kaleida alliance.

"We'll find a way to work with other companies, but the charter members will absolutely get on our services," said Nat Goldhaber, president and CEO of Kaleida.

ScriptX is both a scripting language and a set of data format specifications that will let applications run on all hardware devices that support the services.

For specific products, Kaleida will have to adapt the ScriptX architecture, Goldhaber said, giving charter members a possible marketing advantage.

Future alliance members will be able to take the expected work but won't get the advance look.

According to sources familiar with the deal, the four companies paid between \$1 million and \$1.5 million each to get early access to Kaleida's ScriptX.

In addition to computers, Kaleida is licensing ScriptX to work with a variety of consumer electronic devices that could include intelligent televisions, VCRs, or even game machines that are based on 32-bit processors.

Kaleida will ship an alpha version of ScriptX by year end to software developers, with hardware and software products appearing in time for the 1994 Christmas season.

The first ScriptX-enabled hardware device is expected to be announced this summer when Toshiba and Apple will introduce a CD-ROM-based personal digital assistant that is ScriptX ready.

Applications will have to wait for the completed ScriptX specification, Goldhaber said.

Apple and IBM have already committed to incorporating ScriptX into their computers, Goldhaber said.

"That will give us a base of 5 million systems by the end of 1994 that are ScriptX compatible," Goldhaber said.

Vendors get in line to link NT with SNA

Wall Data's Rumba will bring APPC to IBM mainframes and AS/400

BY CHERYL GERBER
AND STUART J. JOHNSTON

ATLANTA—Several vendors provided a broad range of connectivity options for linking Microsoft Corp.'s Windows NT and IBM SNA host systems here at Windows World last week.

Many packages take special advantage of NT's pre-emptive multitasking capabilities, enabling users who are accessing multiple host-based applications to maintain their links to multiple systems.

Among them, Wall Data Inc. introduced Rumba software development products to make it easier to build NT graphical front ends to host-based Advanced Program-to-Program Communications (APPC) applications, officials said.

Rumba will bring APPC capabilities to NT users hooking to IBM mainframe, AS/400, and RS/6000 systems. Rumba tools will also be available for Microsoft's Windows NT and PowerSoft Corp.'s PowerBuilder.

"We've enabled both PowerBuilder and Visual Basic to make APPC calls so those development tools can be used to write the GUI side of an APPC application," said John Wall, Wall Data's vice president and founder. "In the past, programmers were limited to C or C++."

The Wall Data applications linking NT and IBM will run on Intel Corp., MIPS Computer

Systems Inc. RISC, and Digital Equipment Corp.'s Alpha systems. The NT version will ship within 60 days of NT's ship date, said Douglas Engle, product manager for Rumba tools.

Later this year, Wall Data will release other APPC-based tools that will enable administrators planning to move host-based applications to LANs to manage legacy systems from an NT desktop, a company source said.

Attachmate Corp. also showed a port to NT of its 3270 connectivity software, Extra for Windows. "The Attachmate Extra port to NT uses the Microsoft Data Link Control (DLC) API to communicate between NT and the IBM host," said Joel Rosenberger, Attachmate development manager.

The Bellevue, Wash.-based firm will ship its version within 90 days of NT's shipment, Rosenberger said. Pricing has not been determined.

Digital Communications Associates Inc. said it will ship its Irma WorkStation for Windows NT within 90 days of NT's ship date. It will cost \$495 and support up to 10 concurrent IBM 3270 sessions. It provides connectivity to Distributed Function Terminal, Synchronous DCL, X.25, and 802.2 over Token Ring or Ethernet links, said a DCA representative.

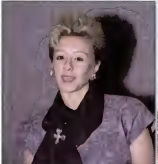
DCA will also manufacture Microsoft's SNA Server for Windows NT for resale by Microsoft.



Designer 4.0 for Windows debuts

Lea Ellermeier, product manager for Designer 4.0, announced and demonstrated the new version of the Windows-based graphics package last week at Comdex. Micrografx Inc. plans to ship Designer 4.0 in June for \$695 (\$149 for current users), offering users a new interface, desktop publishing features, scanner support, and a bit-map editor. (See "Designer 4 gets easier interface," May 24, page 8.)

The Richardson, Texas-based company said the new version of Designer will perform color separations, under-color removal, and trapping. It also offers a graphics database with more than 13,000 clip-art images.



SALLY WEINER/STAFF

AT DEADLINE

Apple's Unix server to get Informix database

Informix Software Inc. will port eight of its database applications and development tools to Apple Computer Inc.'s Unix-based Apple Workgroup Server 95. Programs to be ported to the server include Informix-OnLine, a high-cable database engine with on-line transaction processing and multimedia capabilities; Informix-SE, a SQL-based engine for small- to medium-range applications; Informix-SQL, a distributed database software program for manipulating multiple databases; and the Informix-4GL family of fourth-generation language and programming tools. Pricing has not been finalized. All tools should be available in the third quarter.

—Torsten Bussie

32-bit CorelDraw 5 goes multiplatform

Corel Corp. said last week it is working on a 32-bit version of CorelDraw 5 that will run on Windows NT, OS/2, Unix, and Macintosh. The Ottawa-based vendor said it plans to release CorelDraw 5 — with a common code base portable to all 32-bit platforms — in May of 1994. There will not be an OS/2 version of CorelDraw 4, but the price on CorelDraw 2.5 for OS/2 has dropped to \$199.

—Jeanette Borzo

Sybase to port products to SCO Unix

Expanding the scalability of its database products, Sybase Inc. last week said it would port its System 10 products to The Santa Cruz Operation Inc.'s Unix. The products, which include SQL Server 10, Open Client, Open Server, and Back-up Server products, are scheduled to ship in the first quarter of 1994. System 10 and the Back-up Server product will be bundled with prices starting at \$3,750.

—Yvonne Lee

Tandy ditches PC spinoff, sells to AST

AST Research Inc. last week agreed to buy Tandy Corp.'s PC manufacturing business, including subsidiary Grid Systems Inc., for about \$175 million. If it completes the purchase, AST will become the nation's fourth-largest PC maker behind IBM, Apple Computer Inc., and Compaq Computer Corp., according to data from International Data Corp. AST and Tandy's PC manufacturing operation were in the seventh and eighth positions last year, respectively. Talks between the two companies began after AST agreed to resell Grid's pen-based computer, the Grid Convertible, as the AST PenTee. At the time, Tandy planned to spin off its unprofitable manufacturing business and focus on its core retailing operations.

—Steve Pollitt

Northgate, Unisys will bundle OS/2 2.1

On the heels of its bundling deal with AST Research Inc., IBM's personal software products group last week announced that Northgate Computer Systems Inc. and Unisys Corp. will also optionally bundle its OS/2 2.1 operating system with their hardware. Although Version 2.1 will not be available in volume until June 14, PSP president Lee Reising said his company is taking between 6,000 and 7,000 orders a day for the product over its 800 number.

—Ed Scancell

Perspective 93 conference postponed

Perspective 93, an InfoWorld conference for PC managers, has been postponed, the event's organizers said last week. The conference, which was to have been held June 6-9 near San Francisco, received positive response from readers but not as many preregistrants as expected, organizers said. The conference may be rescheduled.

"Our readers were generally enthusiastic, but we found we didn't give them enough time to plan for the conference," said Stewart Alsop, editor-in-chief of InfoWorld.

Registered attendees will receive registration fee refunds promptly, Alsop said.

For further information, registered attendees can call (800) 848-5381; for other Perspective information, call (800) 633-4312.



Distributed Thinking / Stewart Alsop

Perspective conference still sounds good to us, how about you?

the past few months, you know that we have been putting together what we believed would be a truly important event for our readers.

We had developed what I (ever so humbly) believe was the best-ever program for PC systems managers — on-stage demonstrations of important custom applications, strategic visions of key network operating systems vendors, advice and counsel from experts and our own columnists and staff, and informal demonstrations of key products. We promoted the conference as aggressively as we knew how, by advertising in *InfoWorld*, sending brochures and information to all of our 220,000 qualified readers, and by following up with direct telemarketing. And we received an enthusiastic response from everyone — the readers of *InfoWorld* (more than 4,000 asked for more information about the conference), the vendors who had agreed to sponsor the event, the speakers who agreed to invest their time and

effort in preparing unique presentations, the companies that signed up to demonstrate their products.

So far, so good. Everything, because we did not get enough paid registrations to actually produce the kind of event we had promised. We will be following up with many of the people who expressed interest to find out what we did miss. We think that we made two mistakes: We didn't give our readers enough time to plan to come to the event, and we scheduled the conference at a time of year when our readers are already very busy. Spring Comdex and Windows World was last week; PC Expo will be held at the end of June. And then there is a host of specialized shows and events.

It's always hard to admit when you've made a mistake, but we thought it would be better to postpone the event rather than hold a disappointing one. We still want to find a way to get our readers together to talk about the issues you face day to day. If you have any ideas about how we can find a more appealing way to do that, please let us know. Or, if you have an opinion about how we presented *Perspective '93*, please send me a message at salsop@mcimail.com or at my fax number ([415] 312-0537).

ELECTRONIC MAIL HECK

Perhaps phone companies should just stay out of E-mail. The pay phones AT&T makes that allow you to plug a modem into a data port (both the wall models and the tabletop credit-card-only models) require the user to dial some portion of the number manually. Didn't the designers of the phones ask anybody whether modems were capable of dialing the whole number without any help?

Now MCI Mail, the E-mail subsidiary of MCI Communications, has managed to make its CompuServe gateway more difficult to use. What's more, the company actually seems proud of the fact. The old gateway required an address like the one below:

TO: Pat Messenger
EM: CompuServe
MBX: 99999,999

The new MCI Mail gateway has adopted the X-400 format, which means messages now have to be formatted as follows:

TO: Messenger
EM: CompuServe
MBX: P-CSMAIL

MBX: DDA-ID=99999,999

With the new gateway, when you receive a message from a CompuServe user, the message header says it was sent by "X-400 Originator." The old gateway would actually tell you the name of the sender. And, despite the new gateway, MCI Mail still refuses to forward Internet messages to the addresses at compuserve.com, so you have no choice about how to send messages to CompuServe.

As a frequent MCI Mail user, I can't say I appreciate the idea that this new gateway requires an extra addressing line (one that is meaningless to the user and redundant to the first line). I also don't much like the notion that now I have to remember to add the phrase "DDA-ID=" to the second mailbox line.

I've heard lots of statements to the effect that X-400 is a real standard that we can all adopt; so why the heck is it such a complicated format for addressing mail? Even Internet addressing is easier to figure out than X-400. Couldn't we make progress in the form of making E-mail easier to use, rather than more difficult?

NEWS

HP expands Vectra line.....6

IBM demonstrates OS/2's symmetrical multiprocessing capabilities.....6

Quattro Pro for DOS to gain 3-D features similar to 1-2-3's.....6

Fast Ethernet products are set to debut next year.....6

Vendors and users at Comdex praise NT's benefits for graphics work.....13

SOFTWARE

Numero 2.0's visual scripting system helps developers create automated pen-based forms.....17

Macromedia adds functionality to Director Player for Windows to match the Mac version's.....17

IBM introduces an array of corporate multimedia tools for OS/2.....18

ProtoView's DataTable can create spreadsheets that mimic the look of other Windows spreadsheets.....18

Mozart unveils its client/server development tool for NT.....23

National Payment's Einstein lets users initiate electronic payments without exiting the program.....24

Users can organize data to suit their own needs with the Ecco PHM.....25

HARDWARE

IBM adds multimedia tools to its desktop ValuePoint systems.....29

Card and system makers are debating over a new PCMCIA specification.....29

Star Micronics introduces a dry ink-jet color printer.....30

An EISA-based disk array from HP is designed as a moderately priced storage solution.....30

NEC and MIPS have jointly designed a low-power 64-bit processor.....34

Multimedia PC Marketing Council updates the MPC specification.....35

NETWORKING

Banyan will integrate Windows NT into Vines enterprise networks.....42

EPOCH calendaring software uses OLE links to organize work.....42

McData translates SNA over TCP/IP with fewer protocol conversions.....43

Cheyenne adds multiple server backup capabilities to Arcserve.....43

A Crescendo hub will provide FDDI performance over copper cabling.....44

Oil giant Shell has built its own directory database while it waits for X.500.....46

Microcom ships router software.....46

ENTERPRISE COMPUTING

Apple has a better way to automate workgroup communications.....63

MANAGEMENT

Automated software distribution holds potential to cut administration costs.....67

An Indy 500 racing team makes innovative use of laptop technology.....68

The Enterprise Team looks at ways to increase LAN performance in Down to the Wire.....69

REVIEWS

PRODUCT COMPARISON

In a continuing series on network interface cards, we try out 16-bit 10Base-T workstation NICs.....66

REVIEWS

Norton Utilities, Version 7.0.....63

TEST DRIVES

ECC personal information manager.....66

Statgraphics Plus 6.0 statistics software.....66

CA-RET/Phase 1.0 Windows report writer.....69

Snooper 2.0 diagnostic utility.....69

NEC MultiSync 5FG 17-inch color monitor.....69



Star's 51-144 uses heat fusion.....30

COLUMNS

Window Manager / Brian Livingston.....26

Tech Talk / Steve Gibson.....39

LAN Talk / Paul Merenbloom.....47

To the Editor.....48

From the Editor / Ed Foster.....49

Peer to Peer / Kent Summers.....49

From the Ether / Bob Metcalfe.....52

Help Desk / Brett Glass.....59

Civilized Computing / Cheryl Currid.....62

The Network Curmudgeon / David Strom.....62

First Look / Kevin Strehlo.....96

One on One / Jim Goodnight.....100

Notes From the Field / Robert X. Cringely.....100

INFO WORLD
INTERNET DATA ANALYSIS

POSTAL INFORMATION: Second-class postage paid at San Mateo, CA and additional mailing offices. IntInfoWorld (ISSN 0199-6649) is published weekly, except for a combined Christmas/New Year's issue, by InfoWorld Publishing Company, 155 Bowler Road, Suite 800, San Mateo, CA 94402, (415) 572-7341. IntInfoWorld and Enterprise Computing are trademarks of InfoWorld Publishing Company. Copyright 1993 by InfoWorld Publishing Company. All rights reserved. Reproduction of material appearing in IntInfoWorld is forbidden without written permission. The price of a one-year subscription to IntInfoWorld is \$130 for subscribers in the U.S. and \$145 in Canada. POSTMASTER: Send change of address to IntInfoWorld, P.O. Box 1172 Skokie, IL 60076. IntInfoWorld subscriber services may be reached at this address, or by calling (708) 647-7925. Printed in the U.S.A.

INFO MARKET
Classified Advertising
Pages 89-95

World Class...



Deborah Flores, Senior Network Consultant IOLAB, Claremont, California

The MicroNet Team. World Class Service and Support.

Deborah Flores is a Senior Network Consultant at the corporate headquarters for IOLAB, a Johnson & Johnson company. Being responsible for a network of over 200 users has its demands.

"When we ran into problems with our fileserver that couldn't be resolved, one of your technical support people came to our aid. He found the trouble was with our computer, not with MicroNet's hard drives. Most vendors would have quit after finding that the problem was not theirs, but he stayed on to verify the computer repair and then to make sure we were completely back on line. He gave up a Saturday with his family to help us with a problem that was critical to our business.

"When I have network disk drives to buy in the future they will be MicroNet drives. I will also be recommending them to other Johnson & Johnson companies. I am very satisfied with both the support from your company and your products, they are both World Class.

"I wish that all our vendors and suppliers gave us the quality of support we get from MicroNet. You will always have us and many others as customers with support like this."

For World Class data storage systems, technical support and service, call MicroNet for additional information and the name of your nearest Reseller or Integrator. 1-714-581-1540.



Quality You Can Count On

MicroNet Technology, Inc.

20 MASON • IRVINE, CA 92718 • TEL: (714) 581-1540 • FAX: (714) 837-1164
AppleLink: MICRONET.SLS • Compuserve: 76004.1611



HP adds 50 Vectra PC models

High-end entries to have infrared wireless connectivity

BY STEVE POLLIT

ATLANTA — Hewlett-Packard Co. last week revealed plans to expand its Vectra PC line with 50 new models that offer integrated networking, PCMCIA slots, and infrared wireless connectivity.

The expansion of the Vectra family reflects the growth of the company's PC business, said Kathleen Peck, an HP U.S. product manager for personal computers. That business more than doubled in the first half of

1993 from the same period a year earlier, she said.

Previously two families, the Vectra product line has grown to four. All models will ship in June except the Pentiums; they will all sport local bus graphics and a 486 or faster processor. A PCMCIA slot option is available on each system.

At the top of the line is HP's Pentium system family. A full-size cabinet will include two Peripheral Component Interconnect slots, two ISA slots, infrared communications, and an integrated network adapter. The Pentiums will ship in August or September.

A level down from the Pentium PCs are the XM models, which offer a proprietary local bus implementation, a full-size cabinet, and built-in infrared and Ethernet communications.

The M models are housed in a full-size cabinet; those carrying an M1 designation have an Ethernet network interface card integrated on the motherboard. N models use a slimline cabinet, with N1 models carrying integrated network interfaces.

The M models will range in price from \$1,000 to \$2,000 without monitors; the N models will cost approximately \$100 less

if similarly configured. An XM system with 4MB of RAM, a 120MB hard drive, and a 33-MHz 486SX is \$1,500 without a monitor.

The infrared communications, called Serial InfraRed (SIR), will be included on the more powerful Vectras and on certain HP peripheral devices. HP's palmtops have always had the patented infrared eye to transfer data to other systems.

The SIR technology is cheap, fast, and uses little power, said Eng Tan, a business planning manager in HP's personal systems lab in Bristol, England. It is highly useful for localized data transfer operations such as connecting a desktop or palmtop system to a printer or passing data between systems in close proximity. Tan said, SIR supports speeds of up to 115KB per second, approximately 50 times faster than the speed of a 2,400-bit-per-second modem. Tan said. Other vendors may license SIR for a one-time fee of \$5,000.

"We would like to see this become used in a range of products," Tan said. "We see a world where office equipment like copiers and faxes will be connected."

A Kodak moment with Kerrey

Sen. J. Robert Kerrey, D-Nebr., was scouting out the new technologies at spring Comdex last week. Although he no doubt was at the show to gather data for the technology subcommittee he serves, Kerrey seemed especially taken with *InfoWorld* photographer Sally Wiener Grotta's Kodak DCS digital camera. Kerrey is a member of the Appropriations subcommittee of the Commerce, Science and Transportation Committee, which is considering a bill to fund the data superhighway. The superhighway is a project to support wide area communications for business, education, and consumer use.



SALLY WIENER GROTTA

IBM speeds delivery of multiprocessing in OS/2

Added performance to match NT's

BY ED SCANNELL

ATLANTA — IBM announced last week stepped-up delivery of the symmetrical multiprocessing capabilities it plans to incorporate into OS/2 2.1 this year.

The early delivery is not in response to Windows NT but is being done to tackle performance issues, said Lee Reiswig, president of IBM personal software products (PSP) group.

Coincidentally, Windows NT — the other major operating system to sport such sophisticated capabilities — was also being introduced here at spring Comdex.

Originally, IBM's PSP group did not plan to introduce into OS/2 such capabilities until shipment of its microkernel-based version — Workplace OS — due the first half of 1994.

"We have coprocessored systems now that are limited in our server systems," Reiswig said. "This would be more generic support that could benefit applications in general."

PSP showed OS/2 2.1 performing four-way symmetrical multiprocessing on an AST Research Inc. server. The AST server used four 50-MHz 486 processors.

One of the short-term problems IBM will face in testing symmetrical multiprocessing is the lack of available applications that have been tested with multiprocessing.

"What works in a single-processor environment does not

necessarily work in a multiprocessor environment," Reiswig said. "There will have to be a fair amount of applications work done for NT and OS/2 to make even these 32-bit apps be multiprocessing apps."

PSP will begin formal beta testing of its symmetrical multiprocessing support this summer among corporate customers and application software developers.

The finished product will be delivered by year end, most likely as an add-on capability.

Also shown last week for the first time was an alpha version of Workplace OS with an OS/2 look and feel, which ran on a Pentium-based system. The complete version will be capable of seamlessly displaying multiple personalities, including those for Unix, Windows, and DOS.

To run Workplace OS, users will need at least a 486-based system with 8MB to 12MB of RAM.

Although it can be used as a client and/or a server, IBM will initially market Workplace OS as a server product.

PSP officials continue to watch for market acceptance of Windows NT before they commit to putting NT capability into Workplace OS.

Beta testing for the core product begins next month, but testing for the DOS and Unix personalities will not start until the third quarter, with testing for the OS/2 personality scheduled for the fourth quarter.

NetWare Client for Windows NT readied

BY STUART J. JOHNSTON

ATLANTA — Users here got their first beta demonstration last week of a Novell Inc. technology that will let them use Windows NT as a NetWare client or applications server.

Novell will deliver its NetWare Client for Windows NT within 60 days after Microsoft Corp.'s Windows NT ships this summer, said Bob Ross, senior

development manager for the product.

It will include compatibility with all Novell's network services including imaging, telephony, and messaging, and it will work with Novell's coming products for software distribution, licensing, and network management.

The 32-bit client software, which lets NT software access data from the NetWare LAN, is designed to work with a variety of Novell transport protocols, including IPX/SPX II. However, it will not work with the IPX/SPX protocols provided by Microsoft on the NT CD-ROM distributed last fall, Ross said. Users will need protocol stacks provided by Novell.

Microsoft provides the protocols to support those applications that bypass the NetWare requester and write directly to the protocol stacks. A Microsoft representative said the company expects most NetWare customers will use the Novell protocols.

Nonetheless, Ross insisted that Novell and Microsoft have been "cooperating very close-

ly" to ensure NetWare and NT work well together. But he did not back away from the Provo, Utah, firm's long-standing position that NT is not a great server or networking system.

"NT makes sense as a client but not as a network operating system [because] the two [tasks] run counter to each other," Ross said. "An applications server is between both worlds, and the market will determine [whether NT succeeds at that]."

The NT client also supports symmetrical multiprocessor machines and tightly integrates with the NT user interface, appearing as another set of NT services.

For example, NetWare's log-in services work with NT's security but let administrators set individual log-ins for each NetWare server, Ross said.

Print Manager can "dovetail in" with NT, enabling users to start, manage, and reprioritize print jobs within NT.

Novell's NT requester is written in C so it can be moved to MIPS Computer Systems Inc. and DEC Alpha versions of NT.

Correction

Due to editor error, three products that qualified for the Buyers Assurance Seal in the May 24 text retrieval comparison (page 123), did not receive the seal. dSearch, Isys for Windows, and ZyIndex for Windows all qualify for the seal. *InfoWorld* apologizes for this omission.

In the May 24 supplement on Windows NT (page S92), a headline erroneously identified David Thacher as Paul Thacher. *InfoWorld* regrets the error.

It drives

the

When you oversee the most technologically advanced race in the world, the engine is running long before the race starts. Massive amounts of data need to be collected. Everything from



entry fees,
qualifying
times and

speeds to engine serial
numbers and driver and
crew information. Then
all the data collected dur-

PCs

that

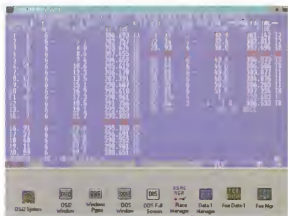
ing the race needs to be compiled
so the results can be validated.

At the world's most famous
motor speedway, mission critical
is a way of life. That's why the
United States Auto Club (USAC*)
and the Indy 500® have a com-
puter system with the horsepower
to get the job done. And OS/2® is
the driving force behind it.

With true pre-emptive multi-
tasking and multithreading
capabilities, OS/2 helps USAC
process Indy 500 data at
record speeds. In fact at this
year's Indy, USAC is testing an
OS/2-based system that
tracks cars via radio signal.
In 1994, OS/2 will drive the

drive the

Indy 500.



official timing and scoring system,
and determine the actual winner of
the race.

Whether you measure speed
in MPH or MHz, OS/2 brings
the same high performance to all your DOS,
Windows™ and OS/2 applications. And our soon-
to-be-released Version 2.1 will be even more
powerful. To find out how OS/2 can help your
386 and 486 machines run on all cylinders, call
1 800 3-IBM-OS/2.*

Operate at a higher level.

*In Canada call 1-800-465-7999

IBM and OS/2 are registered trademarks of International Business Machines Corporation. Indy 500 is a registered trademark of IMS Corp. Windows is a trademark of Microsoft Corporation. USAC is a registered trademark of the United States Auto Club. © 1993 IBM Corp.



Copyright © 1993 IBM Corporation

Some PowerPC Macs to use PCI

By STEVE POLLIT

ATLANTA — Apple Computer Inc. announced at Comdex last week that it will migrate future generations of PowerPC-based Macintoshes from its NuBus architecture to the Peripheral Component Interface (PCI) bus.

PCI local bus is expected to soon become a major standard in the PC market, and a number of vendors at the show announced products embracing it. Intel Corp. currently the only vendor producing PCI chips, last week released pricing for its PCI chip set. Now available in small quantities, pricing for 10,000 sets runs from \$45 to \$98 depending on processor and ex-

pansion bus.

Apple will not quickly drop NuBus; instead, it will first bring out PowerPC systems using the existing Macbus and later move a second generation of PowerPCs to the PCI.

Apple expects to release the first PowerPC Mac models in the first half of 1994, said Ross Ely, Apple product manager for desktop RISC systems.

The key reason for choosing PCI was its 32-bit data path and its 132MB-per-second (MBps) maximum speed, Ely said. Maximum NuBus speed is 40MBps.

"We did a huge study of all the bus options and determined what we would need down the road," Ely said. "Video and multimedia applications really

push the need for speed. That's why we will be transitioning to PCI," he said, noting that NuBus and PowerPC are compatible, if not complementary.

Pieter Hartsook, editor of *The Harlequin Letter*, a Macintosh market research service, agreed that NuBus can hamper advanced graphics applications.

"The NuBus really becomes a bottleneck when you talk of large bandwidth and fast clock speed," Hartsook said. "PCI takes care of those concerns."

Ely also said PCI is attractive because it can easily handle plug-and-play functionality, an alternative 3.3-volt PCI specification is being finalized, and "a plethora" of peripheral vendors are expected to endorse PCI.

Quattro Pro DOS upgrade adds 'notebook' interface

By DOUG BARNEY

In a move hailed by DOS diehards, Borland International Inc. is prepping an upgrade to Quattro Pro for DOS that boasts three-dimensional capabilities similar to those pioneered by Lotus Development Corp.

Slated to ship this fall, Quattro Pro for DOS, Version 5.0 should include the notebook interface for managing worksheets, a feature that debuted in Borland's Windows spreadsheet, company sources revealed last week.

The product is aimed at the vast base of 1-2-3 for DOS users, which Lotus is trying to move to its Windows version, sources inside the company said.

Although Lotus is largely focused on Windows, it began giving nondisclosure previews last week of its upcoming DOS release. This upgrade to 1-2-3 for DOS, Release 3.4 reportedly boasts a dramatically new, more graphical interface.

Borland is catching up with Lotus by also embellishing its spreadsheet with 3-D capabilities, which operate on the new notebook interface. The notebook lets users work on multiple worksheets simultaneously, each with a tab and a descriptive name. Users can toggle between sheets by clicking on the tabs.

ture, users can copy and paste worksheet models from one page of the notebook to another. And like its Windows counterpart, the DOS version allows users to drag and drop pages.

Quattro Pro for DOS and Windows user Dan Atkins uses the notebook feature to create multiple sheets with the same formatting. He can then link them and perform sums and other calculations across the multiple sheets.

"The notebook metaphor makes it a de facto 3-D product. It gives you that extra dimension," said Atkins, a senior researcher for United Health Care Corp. in Minneapolis.

DOS brought Quattro Pro for DOS has not been completely rewritten, it did receive an infusion of Turbo Pascal code to implement the notebooks, according to Borland developer sources.

The DOS product should be packaged in a simultaneous upgrade with Quattro Pro for Windows 5.0, renamed from 2.0 to reflect its parity with the DOS version, also slated to hit this fall. Quattro Pro for Windows 5.0 is in small-scale beta testing, and the new notebook interface full beta in the next few weeks.

The upcoming Borland DOS product should run in as little as 512KB of RAM and on 8088 processors when running in character mode.

Hardware to enable Fast Ethernet

Faster adapters and hubs expected by end of year

By JAYNE WILSON

Users grappling with network traffic jams could get relief by the end of the year when the first "Fast Ethernet" products are expected to ship.

Fast Ethernet promises to deliver 100Mb to the desktop for less than twice the cost of 10Mb Ethernet.

3Com Corp. last week gave one of the first public demonstrations of the technology and committed to delivery by next year (see chart).

"We think this [demo] proves Ethernet doesn't break at 100Mbps per second [Mbps]," said

Pat Conlon, 3Com's project manager for 100Mb Ethernet.

To implement Fast Ethernet, customers with conventional Ethernet would buy PC adapter cards and hubs. These products will incorporate processors and repeaters that enable existing Ethernet to run at 100Mbps. Some chassis hubs may be upgradeable to 100Mbps capability.

Fast Ethernet aims at the 20 million Ethernet installed base by using existing network management and cabling. Other high-speed technologies need different cabling and are geared to backbone implementations.

Users at Stanford University

Hospital, in Palo Alto, Calif., are looking forward to Fast Ethernet. "Sending CAT scans, ultrasounds, and X-rays over the network bogs down an ordinary Ethernet," said Frank Evans of the hospital's engineering department.

"As network PCs proliferate and today's more powerful PCs and applications drive more data into the network, Fast Ethernet provides a simple migration from 10Mb," said Doug Spence, a 3Com vice president.

3Com — along with Grand Junction Networks Inc., Sun Microsystems Inc., and others — is a proponent of a standard for Fast Ethernet called Carrier Sense Multiple Access/Collision Detection (CSMA/CD), which would speed up the existing Ethernet Media Access Control (MAC).

An alternative view called 100 Base VG — backed by Hewlett-Packard Co., AT&T, and others — would use switching technology to replace the MAC.

CSMA/CD limits links between hubs and PC nodes to 100 meters; longer distances will require bridges and repeaters. 100 Base VG can extend beyond 100 meters and requires no bridging.

The IEEE will decide on a standard for Fast Ethernet in July. However, observers say it is possible users will have two standards from which to choose. Vendors from both camps vov to keep prices affordable.

Other vendors working on Fast Ethernet products include Grand Junction, HP, Ungermann-Buss Inc., Wellfleet Communications Inc., David Systems Inc., and Optical Data Systems Inc.

— Steve Pollit contributed to this report.

Alliance with HP gives Next marketing muscle, credibility

By GATE CORCORAN

SAN FRANCISCO — An alliance with Hewlett-Packard Co. gives Next Inc. credibility and an enterprise market, but it won't necessarily win over corporate users.

Next announced the HP alliance at NextWorld Expo here last week, as it started shipping NextStep for Intel.

The two companies will jointly market the PC-based object-oriented development environment to financial companies starting this month, while Next works to complete an HP PARISC version of NextStep for release in mid-1994.

NextStep's Portable Distributed Objects and network management software running on HP's Unix will ship this year.

In the past NextStep was praised for its development environment, but many corporate users were reluctant to commit to its proprietary hardware and questioned the company's long-term viability.

But the move to open hardware and HP's service and stability could lure new users to Next, users and consultants said.

"HP is very good for Next. It's a very rigorous company," said William Young, senior systems engineer for Trident Data Systems in Los Angeles.

On the down side, HP and Next will compete against Sun Microsystems Inc., which has dominated the trader portion of the financial services market. But HP's presence in the HP world-wide director of financial services marketing, sees an opening. "A lot of these users are faced with dramatic changes anyway, as Sun is going to Solaris [2.0]," he said. "If they have to consider Solaris, they may as well consider us."

Next also announced at the show a \$299 NextStep 3.1 for Intel evaluation kit is available until July 31; NextStep for Intel 3.2, with updated drivers, will ship in the fall, and a video code object, NextTime, will ship next year.

3Com's Fast Ethernet test results

Last week, 3Com became the first company to release performance results for 100Mb Fast Ethernet...

The Task:
Both client PCs read the same 64KB data file off the server 2,500 times (a total of 156MB of data)



The Server:
Processor: 66-MHz 486 NOS: Standard NetWare 4.0 Bus: EISA
Adapters: One 3Com EtherLink; three parallel tasking adapters;
one 100Mbps prototype adapter

The 100Mb Client:

Processor: 33-MHz 486 Bus: EISA Adapters: One 100Mbps prototype adapter (CSMA/CA)

The 30Mb Client:

Processor: 66-MHz 486 Bus: EISA Adapter: One 3Com EtherLink3

The Results:

The 100Mb client read 156MB of data in 17 seconds. It read the data at about 78MB per second.



The 100Mb client read the same data in 2:26. It read the data at about 8.5MB per second.

SOURCE: 3COM

DOUG BARNEY/REUTERS

Smartcom For Windows.

We Worked Longer And Smarter To Make It Easier and Faster!

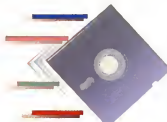
\$49 Limited Time Offer
U.S.
Regular Price \$149 U.S.



Connect to PCs, Macintoshes®, DEC Vax, Mininet, DataView, or almost anything else



The Editor creates documents with color, ANSI graphics and more



Send and receive files with speed and confidence



Assign edit and program actions, macros, scripts to keys for easy access



Connect to your favorite online service with a keystroke or a click



Available in five languages, Smartcom can be your international standard



Easy enough for novices, sophisticated enough for experts



Accessing E-Mail and editing messages is easy



Automate communications and create custom programs with SCOPE scripting language



Download and view GIF images, even create slide shows



Supports Hayes ESP accelerator for faster Windows communications



User-defined Smart Buttons do your work for you - just click!

Finally, communications software that lets you run Windows™ the way you had hoped - easily and quickly. Turn it on and this powerhouse automatically configures the modem, sets the speed, and gets you communicating right out of the box. With Smartcom™ for Windows, you're always getting constant, easy to understand visual feedback on call status and file transfers. *Computer User* says Smartcom "fills a gaping hole in the Windows world."

Since Smartcom for Windows is easier to use, you'll be a speed demon on the job. Our powerful SCOPE scripting automates repetitive tasks to save you time and money with on-line services and mainframe connections. It even has a Learn option that records your keystrokes to



automatically create button driven scripts for accessing E-mail, printing, customizing - just about anything. According to *Windows User*, "performance will never be a worry."

With Smartcom for Windows 5 language options, you can finally set the standard for global communications too. It can be used with high-speed modems, ISDN, LANs, Hayes® ESP™ Communications Accelerator, and NetBIOS or TCP/IP internetworking.

For more information on the communications software that *Windows User* called "absolutely brilliant," phone 1-800-93-HAYES. In Canada, call 1-800-665-1259.

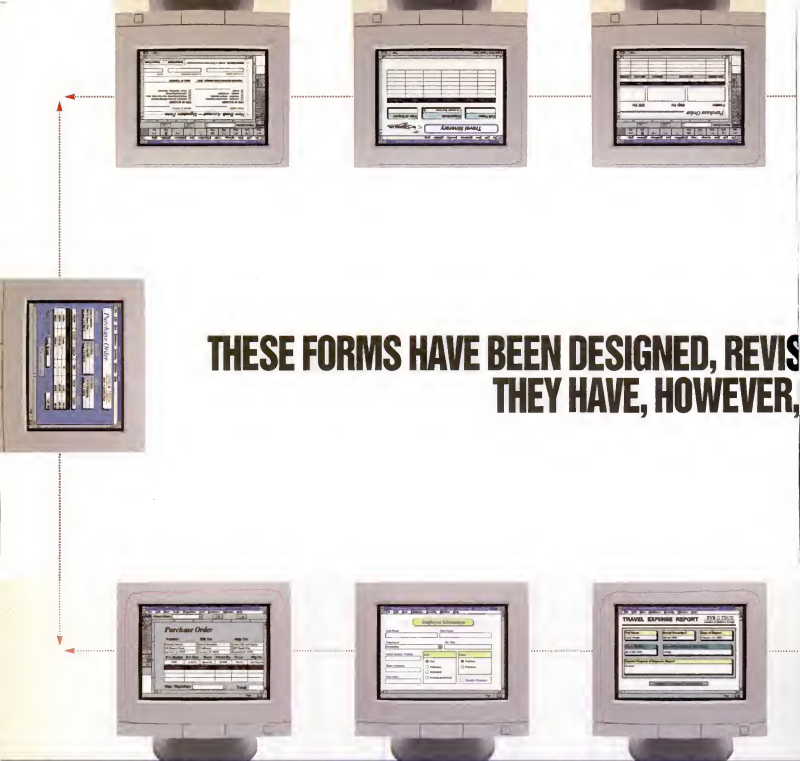
Make it easy. Make it fast. Make it Smartcom for Windows.



Why settle for anything less? Hayes products have the computer world talking. More than ever.

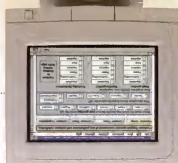
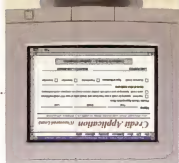
Go Online with Hayes BBS; call 800-874-2937 or 404-446-6336.

©Copyright 1993 Hayes Microcomputer Products, Inc. P.O. Box 10203, Atlanta, GA 30348. Hayes, the Hayes logo and ESP are registered trademarks and Smartcom is a trademark of Hayes Microcomputer Products, Inc. Other trademarks mentioned are trademarks of their respective companies.

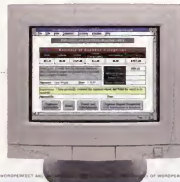


THESE FORMS HAVE BEEN DESIGNED, REVISED, THEY HAVE, HOWEVER,

INTRODUCING WORDPERFECT® INFORMS. Welcome to the first software package that can take most of the work — and all of the paper — out of routine office paperwork. With WordPerfect® InForms, any business form your company needs can be created, distributed and filled in electronically, and the information can be written directly to your database. So you'll never have to lay a finger on another invoice, timesheet, purchase order or employee record again. ® The WordPerfect InForms Designer program (available for Windows) lets you quickly create the electronic equivalent of any paper form you're using now (complete with logos, if you like) for distribu-



**D, MAILED, FILLED OUT, SIGNED, AND FILED.
NEVER BEEN TOUCHED.**



WORDPERFECT AND WORDPERFECT CORPORATION ARE THE UNITED STATES AND FOREIGN PATENT OFFICES HAVE GRANTED WORDPERFECT CORPORATION PATENTS IN THE UNITED STATES AND FOREIGN COUNTRIES. WORDPERFECT AND WORDPERFECT CORPORATION ARE TRADEMARKS OR REGISTERED TRADEMARKS OF WORDPERFECT CORPORATION IN THE UNITED STATES AND FOREIGN COUNTRIES.

tion by e-mail to anyone in your organization. The Filler program (available now for Windows, and soon for other platforms) then makes short work of filling in the blanks — and even signing your documents — electronically. WordPerfect InForms supports desktop databases such as dBase, Paradox, FoxPro and DataPerfect®, as well as SQL databases like Oracle and Sybase, and it can act as a powerful front-end to any of them. So WordPerfect InForms is not just the end of paperwork as you've known it. It's a better way of managing and sharing business information. For more information or a free demonstration disk, call WordPerfect at (800) 526-9887.



WordPerfect®

COREL DRAW!

The Best in Graphics

...and more!



Get animated with CorelDRAW 4!

CorelDRAW is renowned for its powerful graphics capabilities. CorelDRAW 4 now leaps even further ahead by adding page layouts, animation and OCR, as well as hundreds of other feature enhancements. It's the best value in software today—and it's still the easiest to use!

CorelDRAW 4 is the ideal desktop publishing tool. It includes illustration, charting, photo-editing, tracing/OCR and presentation capabilities...and so much more! There are advanced word processing features, multi-page layouts and dozens of artistic and special effects. It's packed with more fonts, more clipart images and symbols, more graphic tools and business applications. And now CorelDRAW 4 also includes CorelMOVE, a brand new animation module.

PAGE LAYOUT CHARTING ILLUSTRATION PHOTO-PAINT TRACING/OCR PRESENTATIONS FILE MANAGEMENT ANIMATION

- Comprehensive DTP Features
- Flexible Multi-Page Layouts
- Enhanced Word Processing
- Advanced Direct Scanning
- Powerful OCR (Optical Character Recognition)
- Single-Step Business Forms Tracing
- Thousands of Fractal Textures and Fills
- Dazzling Artistic Tools and Special Effects
- Convenient Spreadsheet and over 80 Chart Styles
- Object Data Management
- Over 5,000 "Drag and Drop" Symbols and Shapes for faster, easier selection and placement
- Over 18,000 Clipart Images and Symbols
- Over 750 Fonts (650 Bitstream and ITC)
- Complete Color Separations
- On-line Help
- 20 Photo-Paint Filters and 14 Image Correction Filters
- 37 Import/Export Filters
- 21 Transition Effects
- 125 CorelMOVE Animations and 420 Cartoons

18,000
CLIPART
images and symbols
750
FONTS

ONLY
\$595

Registered User Upgrade \$249
CorelDRAW 3 - Now Only \$199



ALSO INCLUDES TWO BONUS CD-ROMs
—featuring a complete CD version of CorelDRAW 4 plus libraries of clipart images and symbols, fonts, animation and sound, and a Video for Windows enhanced QuickTour.



United States and Canada

1-800-77-COREL
ext.22

See us at PC Expo Booth #2260



Create Dazzling
Illustrations



Dynamic
Presentations

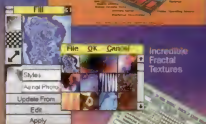
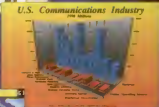


Comprehensive
DTP Features and
Multi-Page Layouts

Variable
Charting



Object
Data
Management



Incredible
Fractal
Textures



Users praise NT's graphics support at Comdex

BY SHAWN WILLET
AND JEANETTE BORZO

ATLANTA — NT promises to paint a rosy future for graphics professionals, but users should expect a full palette of NT applications soon.

At Comdex here last week, vendors and users alike touted NT's benefits for graphics work: full 32-bit addressing, multitasking, and portability to powerful RISC platforms.

"I have a 32-bit machine. Why not have a 32-bit operating system?" said Jamie Cook, a photographer who uses Altamira Software Corp.'s Composer and came by to see the NT version of the new photo composition package. "With multitasking I can work on two objects at once. It is a big advantage," he said. Altys Corp., Altamira, and Autodesk Inc. were among the vendors showing their graphics applications running on Windows NT.

sion of Windows known as Chicago.

"You can get 90 percent of the benefits of NT by writing to one of the other Windows 32-bit APIs," said Eric Lyons, product manager for Altamira's Composer product. Microsoft has sent conflicting signals as to whether Chicago or NT will be the next step in Windows

client platforms, Lyons said.

"There are other fish to fry in the Windows market," said Bill Caffery, vice president and director of the Gartner Group's advanced technology group, in Stamford, Conn. "We think NT has a long life ahead of it, so why should any of Microsoft's partners

try to sprint the first mile?"

As a caveat to graphics users thinking of moving to NT, vendors and users said running Windows 3.1 applications on NT can mean a performance hit depending on the processor used. NT must perform the equivalent of an emulation to run Windows 3.1 applications, slowing graphics applications from 10 to 30 percent.



Outrageous Upgrade.

\$199
Competitive Upgrade Offer!

New Competitive Upgrade Can Save
dBASE, FoxPro, Paradox, Access And
ARAGO Users Up To \$1,291!

\$199 Includes Your Choice Of Any One Of These Absolutely FREE!
Offer Good For Users Of Any Competitive DBMS — Call Today!



Over 150 time saving, problem solving functions to save high performance packages. Atom your productivity with this valuable library.

Compile almost any dBASE IV application in three easy steps — and produce executable (.EXE) files with the efficiency of CA-Clipper.

dBASE apps cover all other with new CA-dBase 2.1 — the first dBase-compatible database and language for Windows.

The Complete, Professional
Programming Environment.

CA-Clipper 5.2 is a robust language, an efficient linker, a flexible preprocessor and a high-performance compiler. It includes an editor, debugger and make utility for creating PC and LAN-based applications.

Faster Access, Faster Screen
Writes, Faster Performance.

Address up to 52 megabytes of virtual mem-

ory — with shorter access times. New Expanded Memory System (EMS) capabilities including LIM 4.0 support, plus a Virtual Memory Manager that uses dynamic overlays to let you exceed available RAM.

New RDBs For FoxPro,
Paradox and dBASE IV.

Replaceable database drivers for all the most popular development systems. Plus you can customize Clipper with user-defined commands and functions. And seamlessly

integrate modules from languages such as C, Assembly, dBASE and Pascal. There are no runtime fees, no additional licenses, no LANPaks.

So what are you waiting for?

Call right now and upgrade to the new standard in Xbase development.

COMPUTER ASSOCIATES
SOFTWARE BY DESIGN

SEE YOUR LOCAL
DEALER TODAY OR CALL
1-800 CALL CAI EXT. 176.
Operators are standing by to take your order. Offer good for a limited time only, so don't wait. Call today!

New CA-Clipper 5.2.

Comparison based on ProPlot Version 2.0 for DOS and dBase IV Version 1.5.
© Computer Associates International, Inc. One Computer Associates Plaza, Ithaca, NY 14850-7000. 1-800-225-5224. All product names referenced herein are trademarks of their respective companies.



Altys' Virtuoso was one of several graphics packages for Windows NT demonstrated at Comdex in Atlanta.

But not all vendors are rushing to port their graphics applications to NT because of uncertainty over Microsoft Corp.'s plans for NT's widespread use as a client.

For those applications coming over in the near future, NT's large memory addressing capabilities will let users shade objects fully in just seconds, vendors said. The operating system will also be able to draw pixels 10 to 40 percent quicker, sources said, and NT applications can be ported to fast platforms such as Digital Equipment Corp.'s Alpha PC or MIPS Computer Systems Inc.'s R4000 line.

Autodesk officials said NT's capability to support multiple processors could result in a two-to-one speed improvement.

Altys product manager Rusty Williams says that Altys' Virtuoso program will get 40 to 50 percent speed increase over FreeHand, the Windows 3.1 version currently sold by Aldus Corp. Virtuoso will ship sometime after NT ships this summer, Williams said.

Corel Systems Corp. is another vendor porting its graphics program to NT, but not until next year, Corel Systems Inc. said it is still deciding if it will bring Photoshop and Illustrator to NT.

Other vendors said they won't port their graphics applications immediately, noting that Microsoft is promoting NT as a server platform and it's not clear how most client versions of NT will be sold.

Adding to the confusion is the existence of three separate Windows 32-bit application programming interfaces (APIs): one for Windows 3.1, one for Windows NT, and one for a future ver-

Feature	CA-Clipper	Paradox	dBase IV
Enhanced Database System	YES	NO	NO
Real-time Database	YES	NO	NO
Advanced Mathematical Functions	YES	NO	NO
Procedural Data Access	YES	NO	NO
Database Indexing and Sorting	YES	NO	NO
Advanced Database 4.0 Handling	YES	NO	NO
Database and Indexing (100% Case)	YES	YES	NO
Database and Indexing (100% Case)	YES	NO	YES
Database and Indexing (100% Case)	YES	NO	YES



**What will people make of
Anything they want.**

Versa's screen detaches easily, so you can quickly upgrade it, reverse the display or convert to pen.

For the ultimate in expansion and connectivity, Versa offers the latest PCMCIA Type III standard: plug in up to two cards—modems, LAN, storage or, in the future, wireless networking.

What's more, our QuickSwap™ feature lets you change cards without powering down.



The LCD status panel gives a quick overview of what's going on inside your Versa—power management status, battery life and more.



▲ Versa comes standard with a Nickel Metal Hydride (NiMH) battery, for longer life and quick recharging.



Choose Versa with 256 brilliant colors and the latest active-matrix screen technology, or with 64 crisp shades of gray. Either way, Versa is the first notebook to use local bus video architecture, for dramatically faster graphics performance.



*User limited warranty is standard. UltraCare enhanced warranty program is included in first year upon completion of UltraVue Versa registration card. For more details, call 1-800-NEC-INFO. **Microchrome 8.8 lbs. color. ***For models/updates available 3rd quarter 1999. RAM expands to 12MB today, 20MB over 3rd qtr '99, 33MB over 3rd qtr '99. This feature has not yet been approved by the Federal Communications Commission, and models with this feature will not be sold or leased until approval from the FCC has been obtained. UltraVue is a registered trademark of NEC Corporation. UltraVue Versa, TrueColor, QuickView and DoubleTime are trademarks and UltraCare a service mark of NEC Technology Inc. Doubling screen is a trademark of NEC Home Electronics Inc. The most inside eye is a registered trademark of TrueColor. All other trademarks or registered trademarks are the property of their respective holders. © 1993 NEC Technologies, Inc. NEC 05A000091A0D55241

our new UltraLite® Versa™?



▲ Versa's RAM can be easily upgraded from 4MB to as much as 20MB† simply by sliding in a memory card.



As with our award-winning monitors, printers, desktop PCs and CD-ROM readers, the new UltraLite Versa is a prime example of what NEC does best: integrating many new technologies into one seamless, highly functional package.



▲ Versa offers powerful, energy-efficient 3.3V i486SL™ processing. Start with your choice of 20, 25 or 33MHz†† processor; upgrade as your computing needs increase.



▼ Versa offers innovative active-matrix color pen computing,* as well as a monochrome pen model. Versa also converts to a tablet in seconds, for capturing signatures, taking notes or annotating presentations.



▲ To increase Versa's storage capacity, just choose from 80MB, 120MB or 180MB removable hard drives. And Versa comes pre-loaded with Windows™ 3.1 and DOS® 6.0.



▲ With our new DoubleTime™ technology, Versa's battery life can be doubled, instantly, by exchanging the floppy drive for a second battery. Result: an astounding 8-12 hours for monochrome, 5-10 hours for color, depending on usage.

The new UltraLite Versa is perhaps the one notebook computer you should want right now.

That's because Versa's exceptional upgradability and flexibility give you the power to choose the system you need today, and then enhance its features as your needs change.

Making it a notebook you'll still want years from now.

With Versa, you're protected from wasting money on a notebook you might soon outgrow. Protected, too, by a 3-year limited warranty and UltraCare™ enhanced service plan.*

The 6-lb.** Versa is a light, powerful i486SL™ notebook that's perfect for heavy computing, faxing and communicating while on the road.

Giving you a real alternative to the mouse, Versa's optional pen models and pen upgrades† make it easy to take notes or enter data in the field.

Slipped into its optional Docking Station™ unit, Versa offers all the capabilities of a desktop computer. So what do you make of a notebook PC that does all that? Anything you want.

For details on the amazing UltraLite Versa, call 1-800-NEC-INFO or NEC FastFacts™ at 1-800-366-0476, request document 8583772.

Because ▲ is the way you want to go.

NEC

"DISK COMPRESSION IS INHERENTLY MORE FRAGILE... ...USERS OF COMPRESSION SHOULD HAVE A COPY OF NORTON UTILITIES 7.0."

PC Week - May 10, 1993



*Peter Norton, the leader in
data recovery software.*

The new compression technology can put you in a squeeze. You wanted the efficiency, but now you're worried about losing data.

Here's some news that might help you relax. No other single product gives you the complete compressed data protection of Norton Utilities® 7.0.

It's the only utility specifically designed to recover data from DOS 6.0 DoubleSpace, Stackcar and SuperStor compressed drives. Only with our

Speed Disk® feature can you truly defragment the drives, making your recovery a fast, painless process.

You also get the Norton Disk Doctor®, with its nine automated repair functions specific to compressed drives. Plus the new Norton Diagnostics, which analyzes and tests all vital system components, including memory, video, CPU, system boards, communication ports, keyboard, mouse and more.

You can't put a price on peace of mind. But we'll try. Take advantage of the offer below and discover the ultimate security of Norton Utilities 7.0. It just might get you out of a tight spot.

**THE NORTON
UTILITIES**
SYMANTEC.

Purchase DOS 6.0 and receive Norton Utilities 7.0 for only \$99.00.* Look for specially marked packages at your local dealer, or order direct by calling 1-800-453-1062 ext. AP92. Users of any previous version of Norton Utilities can upgrade to 7.0 for only \$49.00 by calling the toll-free number above.

*Offer good with proof of purchase for new and existing DOS 6.0 owners. Suggested retail price in U.S. dollars plus shipping and applicable taxes. Actual price may vary. Offer good while supplies last. Valid in the U.S. and Canada only. For more information in Europe, call 31-71-353111. In Australia, call 61-2-879-6577. In Canada, call 1-800-465-2266. Everywhere else outside U.S., call 408-252-3570. The Norton Utilities, Norton Disk Doctor and Speed Disk are registered trademarks of Symantec Corporation. Other names are trademarks of their respective holders. Compatible with Windows 3.0 and 3.1, DOS 3.3 and higher. ©1993 Symantec Corporation. All rights reserved.

NEWS / SOFTWARE

UPDATE

SHIPPED

Abacus II PC for DOS ships from A.S. Inc.

An accounting package from A.S. Inc., formerly Abacus Systems, offers job estimating and costing, inventory and order entry, and payroll and taxation. Abacus II PC has no modules but is a complete package that retails for \$995 for a single user and \$10,995 for 10 or more users. (800) 992-0616.

Pilot Software Inc.'s FCS for Windows is a multiuser LAN-based financial application modeling and analysis system that provides host- and PC-based business modeling tools. A license for up to 25 users costs \$39,000. (800) 944-0094.

UPGRADES

Microsoft Bookshelf available for 1993

Users of the 1992 edition of Microsoft Corp.'s Bookshelf can upgrade for \$49 to the 1993 edition, which is shipping now for \$195. The latest edition of the CD-ROM-based product, which offers seven reference books to Windows users, reflects recent geopolitical changes in Eastern Europe. (206) 882-8080.

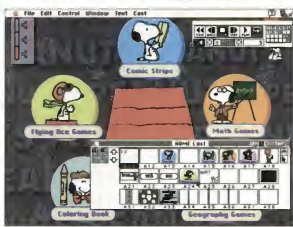
ANNOUNCED

PageAhead releases InfoPublisher 2.0

PageAhead Software Corp. plans to release InfoPublisher 2.0 next month, offering users an Open Database Connectivity-compliant program to gather, sort, and format database information prior to importing it. InfoPublisher will sell for \$295; a developers' kit is \$495. (800) 967-9671.

Timeworks Inc. demonstrated at Comdex last week a 32-bit document publishing technology offering high-end graphics tools, a user-definable level of undo, drag-and-drop colors and styles, and style sheets that apply down to the character level. Timeworks plans to release the yet unnamed technology on a variety of platforms in the second quarter next year. (708) 559-1300.

Deneba Systems Inc. plans to release Canvas 3.5 for \$399 in August. This version of the Macintosh-based drawing program will offer new text flow features, style sheets, line connections that are maintained when users move the connected objects, extrusion features, and support for pressure-sensitive tablets. Users of Canvas 3.0 will be able to upgrade for \$99. (305) 596-5644.



Macromedia's Director Player 3.1 for Windows lets multimedia developers convert existing Mac titles to Windows-ready titles.

Director for Windows upgraded to Mac level

Player features more interactivity

BY KELLEY DAMORE

ATLANTA — The latest version of Macromedia Inc.'s Director Player for Windows, demonstrated last week at Comdex, gives the Windows multimedia market a jump start for developing multimedia titles and demonstrations.

Beta testers of Version 3.1 lauded its increased interactivity, which previously was seen only in the Macintosh version of Director Player.

Riley McLaughlin, a developer at JRA Interactive, in Olympia, Wash., has tested the product for the past six months and uses Director Player to create multimedia-based demonstrations on the Macintosh and PC platforms.

In the past McLaughlin had to trim his Mac-based presentations because the Windows player could not provide the same functionality. With the new version, the interactivity and palette controls are en-

hanced, he said.

"[The new version] is a major advance," McLaughlin said. "One of the best things is that it lets me pull images as I need them from storage rather than load a whole movie into RAM off the bat."

Director Player consists of a Mac-to-PC conversion utility that runs on the Mac and a runtime module on the PC. The program supports Apple QuickTime and Microsoft Video for Windows. Director Player for Windows is priced at \$995. A bundle with the Macintosh version is \$1,795. Owners of previous Windows versions can upgrade for \$199.

An update to the Mac version, Director Player 3.1.3, includes fixes for such problems as the flashing controller with QuickTime 1.5. It costs \$15.

Both products are available now, officials said.

Macromedia, in San Francisco, is at (800) 288-4797.



Numero 2 boasts visual script tool

Pen tool eases form development

BY YVONNE LEE

A visual scripting system in Pen Magic's Numero 2.0 helps developers create automated pen-based forms that export information to other corporate systems.

MagicScript and other improvements take Numero from its original incarnation as a spreadsheetlike financial processor to a full application development tool.

Medical supplier F.D. Titus & Son used the scripts to automate inventory and cost justification analyses for its clients.

"It's a pretty complicated financial analysis, but we've made it simple because MagicScript has just five or six questions it asks [the representatives]," said Timothy Titus, vice president of corporate development.

Users run the scripts by press-

ing a button. A Post button moves totals and summary items to a summary sheet. An Export button automatically saves data into other data formats, including Excel, 1-2-3, and plain or comma-delimited text.

Developers can also create scripts that automatically execute as users fill out parts of a form.

Another automation feature helps users fill in large forms by entering data onto small sheets, or "chits." For example, users could fill in an expense report form by typing in individual chits about expenses. Scripts calculate the information on the main form.

Other features make the program easier to use, including the ability to create choice lists to enter data into a file, support for multiple page documents, integration with the Perspective address book, more custom pens, and an easier way to insert TIFF images.

Numero 2.0 is scheduled to ship June 14 for \$399. Current users can upgrade for \$99 through June 30 and \$149 after that. With a 10-disc package that is priced at \$1,000, developers can attach run-time versions of Numero 2 to their forms.

Pen Magic, headquartered in North Vancouver, British Columbia, Canada, can be reached at (604) 988-9982.



Developers create MagicScript forms by drawing lines to show the processing order.

Gupta, Powersoft cut prices of client/server products

BY KELLEY DAMORE

In a move to make client/server technology available to the masses, two leading tool vendors reduced prices on their existing products.

Gupta Corp. recently dropped the price of its SQL Windows 4.0 Standard Edition to \$199 for registered Microsoft and Sybase SQL Server users, \$1,795 less than the original price. Until July 31, Gupta will

include a router for Sybase SQL Server free of charge.

Users who take advantage of this offer can upgrade to the Corporate Edition, which includes TeamWindows, for \$1,500, officials said.

The company will also offer Gupta Quest for \$395, \$200 less than its retail price.

Powersoft Corp., another tool vendor, said last week it has eliminated its per client and per server run-time licensing fees

for PowerBuilder 2.0.

Powersoft is lowering the price of the PowerBuilder Development Environment for DB2 from \$3,895 to \$3,595 and additional Database Development Kits for DB2 from \$1,495 to \$995.

The moves will broaden the client/server market, analysts said.

"They are structuring the pricing to grow the market and introduce more people to the

technology," said Brent Williams, director of PC software for International Data Corp., in Mountain View, Calif.

"Powersoft has increased competition from Visual Basic and needs to abandon its run-time fees, since Visual Basic is one-tenth the cost and has no run-time fees."

Gupta, in Menlo Park, Calif., can be reached at (800) 444-8782. Powersoft, in Burlington, Mass., is at (617) 229-2200.

API forms Windows-like apps

BY DOUG BARNEY

Basic and C programmers can now build applications that access remote data through generalized message handling and plug that information into a spreadsheet with DataTable, Version 2.0 from ProtoView Development Co.

Data Table can create spreadsheets that mimic the look of other Windows spreadsheets such as Microsoft Excel, the company said. Programmers can set fonts and colors for cells, columns, rows, and tables. It can handle up to 2 billion rows for serious number crunching.

DataTable can be used from within Microsoft's Visual C++ and Visual Basic, and can reportedly access any database through generalized message handling. Custom data entry and display screens can be built,

and an array of operations can be performed, such as sorting, browsing, and formatting.

Applications developed with

DataTable can access any database through generalized message handling.

DataTable can be distributed free of royalty fees.

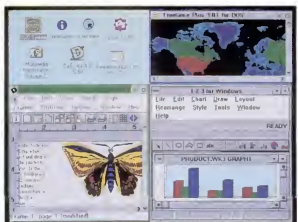
DataTable joins another recently announced spreadsheet-style technology from the DS Group Inc. of Greenwich,

Conn. DS Lab is dubbed a visual spreadsheet because it uses symbols to represent standard modeling elements and arrows to show relationships between numbers. Users click on these symbols and arrows to build a graphical representation of the model.

The product, designed to complement rather than replace spreadsheets, is \$195 for an entry-level version and \$995 for DS Lab Pro, which is designed for large, complex models.

DataTable 2.0 requires Microsoft Windows running in protected mode and sells for \$249.95, with an introductory price of \$149.95 until July 31. Source code is available at a \$149.95 introductory price.

ProtoView, in Dayton, N.J., can be reached at (908) 329-8588. The DS Group can be reached at (203) 861-1833.



In conjunction with OS/2 2.1, IBM has fortified its multimedia offerings with image recognition and networking products.

Tools prep OS/2 for multimedia

BY KELLEY DAMORE AND ED SCANNELL

In an aggressive move to establish OS/2 as a true multimedia platform, IBM this month unveiled a raft of tools for corporate users to access video over networks and sort, query, and manipulate those images.

Ultimedia Server/6000 network software, scheduled to enter beta testing in July, gives organizations a way to create and distribute a range of multimedia applications such as video on-demand, multimedia kiosks, and training applications across client/server networks.

"Passing along video on-demand over networks requires lots of bandwidth, something I think we can now guarantee with this product," said Scott Winters, senior technical director of multimedia for IBM's personal software products. "This should ensure high quality on the client side."

Ultimedia works on IBM's RISC System/6000 servers running AIX with OS/2-based

clients. Future clients to be supported include Windows, Macintosh, and AIX. Winters said.

So far, multimedia has been relegated to a few corporate applications such as training. But Winters indicated that would soon change due to growing interest by leading software vendors who want to include multimedia in their desktop productivity applications.

A number of development tools will be available for users to create applications. One is the Ultimedia Workplace/2 for integrating image, audio, and video objects with current SQL databases. Another is Ultimedia Builder/2, which creates multimedia presentation programs.

Next month, IBM will implement a beta program for an image-recognition software package that can classify, search, identify, and sort images by color, texture, shape, or layout. This program, called Ultimedia Manager/2, lets developers more quickly search through large computer-based libraries for images and graphics.

Third-party vendors unleash a handful of add-on tools for Visual Basic update

BY KELLEY DAMORE

Third-party application development vendors were quick to follow Microsoft Corp.'s debut of Visual Basic 3.0, providing developers with custom controls and add-on products for this client/server tool.

• Sheridan Software Systems Inc. announced an add-on tool that takes advantage of Visual Basic's data access extensions. The tool lets developers design forms for database applications using drag and drop to link table columns to bound controls. Living the form Wizard, VBAassist can generate a form similar to the way Wizard works in Microsoft's Access database. VBAassist 3.0 retails for \$179.

• Index Applications Inc. introduced a function library that

can add text-search capabilities to any application developed with Visual Basic. The \$189 program, called Fast Text Search, provides a bridge for Clipper programmers who want to develop in Windows.

• Micro Data Base Systems Inc., of Lafayette, Ind., introduced an MDBS IV language interface for Visual Basic 3.0 that enables developers to create client/server applications under MS-DOS. The product will be available this fall.

• Micro System Options introduced a new version of 3D Graphics Tools, a set of three-dimensional object manipulation, color drawings, and rendering functions. A Visual Basic version costs \$95.

• Net Manager Inc. announced an interface to TCP/IP that

gives users a TCP/IP protocol stack to help write a network application. The new SDK development kit for TCP/IP is priced at \$500.

• Software Interphase Inc. of Foster, R.I., offers a new version of its on-line help development system for Visual Basic 3.0. The program, Windows Help Mapien, allows users to create and edit help source files, read and write Rich Text Format files, and test a help system. It costs \$199 for a single user.

• Speech Systems Inc. of Boulder, Colo., announced a custom control for Visual Basic that lets developers add speech recognition capabilities to applications. SPOT/VBX is part of the Speech Systems PE4000 system Development Kit and ships in June for \$1495.

Common Ground beats Acrobat to the Macintosh market

BY JEANETTE BORZO

PC managers gained an option for saving time, paper, and money when No Hands Software shipped Common Ground 1.0 for the Macintosh this month.

The \$189 software lets users distribute electronic documents to other Mac users. Users can open the documents and view them on-screen as they were authored, whether or not they have the original application or the original fonts.

"This will make the electronic office more feasible," said beta tester Michelle Swartz, presen-

tations artist at Cisco Systems Inc., in Menlo Park, Calif. "I distribute a lot of [Aldus] Persuasion files. Common Ground maintains the integrity, color, and graphics of the files."

"This saves so much time," said beta tester Hank Beck, president of Printtable Inc., in Stamford, Conn. "The distribution cost for a catalog is \$10 to \$20 a unit. For a CD-ROM, the distribution costs are about \$150."

Being able to distribute information electronically allows faster updates and greater efficiency, testers noted.

"The ability to copy and paste [from a Common Ground file] without having to use a scanner is really helpful," said an airline employee and beta tester. "We would like to put our manuals on the server."

A Windows version of Common Ground is due to ship this summer, and a competing product from Adobe Systems Inc. is due to ship to Mac and Windows users in June.

There are at least two key differences between Common Ground and Adobe Acrobat. Whereas Acrobat uses substitution to mimic the fonts in an

original document, Common Ground duplicates the exact look of the fonts in its exchange format. Also, the recipient of an Acrobat document will need Acrobat to view the document. Common Ground users can enclose a miniviewer with each document so that the recipient doesn't need Common Ground for viewing.

Beta testers and analysts said both differences give Common Ground an advantage over Acrobat, but other issues may determine which of the programs becomes more significant as a document exchange standard.

"If No Hands could have gotten their Mac product out in February and their Windows product out now, Adobe would look pretty bad," said Pete Dyson, editor of the *Seybold Report on Desktop Publishing*. "But their Windows product isn't likely to hit until midsummer."

Still, the option to distribute documents freely without knowing a recipient's applications is the primary point of an electronic document exchange system.

Based in Belmont, Calif., No Hands is at (800) 598-3821.

Egghead's FREE seminars shed new light on corporate computing.

A day full of ideas you won't want to miss.

This summer Egghead brings you Smarter Computing—a series of one-day technological seminars and product-demonstration events designed to give you more than the standard replies about the latest software products. We'll show you how your business can achieve better computing solutions and a better bottom line.

Smarter Computing offers the latest operating systems, newest upgrades, and the best new software—as well as Egghead's own complete software solutions, like electronic commerce. You'll see live demonstrations and talk directly with industry experts who can help you determine how to get the most from your computing investment.

Improving System Performance: Microsoft System Strategies

Make intelligent, flexible systems choices and make your existing PCs work harder. Microsoft will demonstrate a new generation of operating systems and networking software. You'll see the **MS-DOS 6 Upgrade** and **Microsoft Windows for Workgroups**, and hear about future Windows system strategies.



Smarter Computing can expand the way you think about computing, and the way you utilize your current hardware and software.

Increasing Productivity: Software Upgrades

See how leading office software has been improved to increase user productivity! Technical consultants from **Lotus**, **IBM**, and **Borland** will demonstrate the future of office computing. You'll see the newest release of **Lotus 1-2-3** for **Windows**, **IBM OS/2 2.1**, and **Borland's** newest **Quattro Pro** for **Windows**.

Bringing Multimedia to Business

Multimedia consultants from **Media Vision** and **Creative Labs** will show you how to transform your computer by adding full-motion video and stereo sound components such as **Pro Movie Spectrum**, **Pro Audio Spectrum 16**, **Sound Blaster 16 ASP**, and **Video Blaster**. Your business presentations will never be the same!

The Power of Information: New Database Developments

You no longer need a mainframe for sophisticated data storage and management. Specialists from **Microsoft** and **Borland** will show you how the latest hardware and operating systems have changed databases. **FoxPro 2.5**, **Microsoft Access**, and **Paradox** for **Windows** will be demonstrated.

Reserve your space today. It's FREE!

Smarter Computing begins soon in a city near you. Call 1-800-EGG-5569, or fill in and return the attached reply card. On-site registration opens at 8:30 a.m. on the day of the event, and seminars run throughout the day, beginning at 9:00 a.m. and ending at approximately 3:00 p.m.

NEW YORK CITY, JUNE 8

New York Palace Hotel

STAMFORD, JUNE 9

Stamford Marriott

ST. LOUIS, JUNE 10

Holiday Inn Clayton Plaza

WASHINGTON DC,

JUNE 10

Crystal Gateway Marriott

HOUSTON, JUNE 16

J.W. Marriott

ROCHESTER, JUNE 16

Rochester Riverside
Convention Center

PITTSBURGH, JUNE 17

Sheraton Station Square

LOS ANGELES, JUNE 22

Sheraton Universal

SACRAMENTO, JUNE 22

Hyatt Regency

PHOENIX, JUNE 23

Scottsdale Plaza Resort

ATLANTA, JUNE 24

INFORMUM

HARTFORD, JUNE 25

Hartford Marriott/Rocky Hill

FT. LAUDERDALE,

JUNE 30

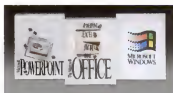
Sheraton Design Center

EGGHEAD SOFTWARE

North America's Software Eggsperts.

Mary Sue Will

POWERPOINT 3.0. BECAUSE A GREAT IDEA DESERVES A GREAT PRESENTATION.



PowerPoint takes full advantage of Windows 3.1 and Macintosh System 7.0. It is available separately or as an integral part of The Microsoft Office.

*Plus 0.50 freight and applicable sales tax if ordered directly from Microsoft. Retailer prices may vary. You must currently be a licensed user of any presentation graphics product or any version of Microsoft PowerPoint to qualify for this special upgrade offer. To qualify for this offer at your reseller, contact your reseller. © 1993 Microsoft Corporation. All rights reserved. Printed in the USA, Microsoft Corporation, One Microsoft Way, Redmond, WA 98073-0900. United States and Canada, call (800) 936-5444. Customers in Canada, call (800) 383-9048.

Circle 100 on Reader Service

You Marry Me?

It's been said that the most valuable currency in the '90s will be ideas. But having an idea and communicating an idea are two entirely different things. Which brings us to our point. Or rather, PowerPoint.

How do you turn your ideas, the points that you want to make, into powerful, convincing presentations?

Consider Microsoft® PowerPoint presentation graphics program for Windows™ and Macintosh®. It will help you get your ideas down, and help you organize exactly what it is you want to say.

Secondly, it will help you make certain all your presentation materials not only look great, but make a very strong business impression as well.

Let's begin with the ideas.

First you want to get them down.

With PowerPoint, you can work out your entire presentation in Outline View. Or, if you'd prefer, you can develop thoughts right on your slides.

The next step is to graphically express those ideas. PowerPoint lets you easily apply more than 150 templates, select from

a gallery of graph styles, or use your Shape Tool to give your presentation a professional look.

Now everything is in place. Everything makes sense. Everything looks terrific. And the best part is, it's easier than you ever imagined.

But then, you'd expect us to say this kind of thing about our product. What, you may ask, do others think

about it? Well, for one, *PC Magazine* gave PowerPoint their Editors' Choice award. Ditto for *Mac User*.

So go ahead. You can feel confident about your presentation. After

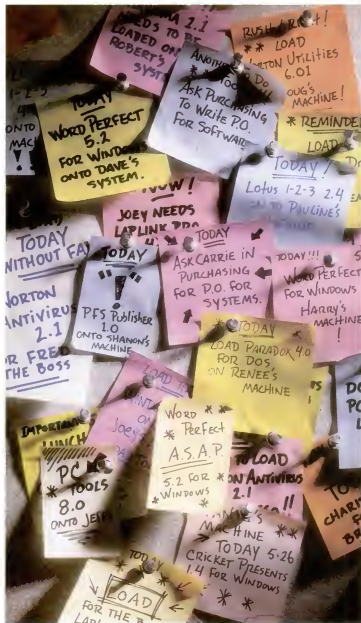


With our unique Shape Tool, you needn't be an artist to easily create terrific diagrams that will result in eye-catching professional overviews, 35mm slides or a dramatic on-screen presentation.

all, now it's as great as your ideas.

If you'd like to hear more about the PowerPoint program, including our \$129* competitive upgrade offer, visit your nearest Microsoft reseller. Or call (800) 323-3577, Department KH7.

Microsoft
Making it easier



TO DO.

TA DA.

No, it's not magic. It's Dell ReadyWare™

Buy any Dell® system, and we'll install your software at our factory. (As if you didn't already have enough reasons to buy from Dell.) So the time you spend installing applications for your users can be spent doing more important things. Like your job. Or maybe even eating your lunch.

And with over 80 competitively priced popular applications for you to choose from, you'll be able to spend your time selecting all of those software applications instead of installing them.

No matter how many applications you choose, we'll pre-load your

SYSTEM	MICROPROCESSOR	MEMORY	HARD DRIVE	MONITOR	PRICE
425u/L	486 SX, 25MHz	4MB	170MB	WinScan® 14C	\$1,999
435u/L	486 DX, 33MHz	4MB	230MB	WinScan 14C	\$1,999
466u/M*	486 DX2, 66MHz	8MB	320MB	WinScan 1595	\$2,999

*Also includes 1700B External Cache and CD-ROM Drive. All systems include 1 desktop drive (2.5" and 5.25"), MS-DOS 6.0, Microsoft® Windows 3.1, and Mouse.

Just a sampling of the many Dell systems available with ReadyWare.

system with all of them for just 15 bucks. Nor \$15 per application. Or \$60 per system like some dealers can charge. One \$15 installation fee gets your system ready to run. And with ReadyWare you can save the time

and expense of multiple P.O.s by ordering your system and software with just one purchase order to Dell. That's right. You can get all this from Dell. The \$2 billion Dell. The FORTUNE 500® Dell. The third largest PC maker in the world Dell. And now the we'll-load-all-the-applications-that-you-want-for-only-\$15 Dell.

All you have to do is order MS-DOS 6.0, Microsoft Windows 3.1 (for Windows applications), and your ReadyWare choices when you order your systems.

Then get prepared for pre-loaded systems that totally blow away the competition. And that pile of "to do" notes on your desk.



DELL™

TO ORDER, CALL
800-456-5777

HOURS MON-FRI 9AM-5PM CT SAT 10AM-4PM CT SUN 12PM-5PM CT
WHEN CALLING, PLEASE REFERENCE #10204

FORTUNE 500 is a registered trademark of The Time Inc. Magazine Company. MS-DOS and Microsoft are registered trademarks of Microsoft Corporation. The Intel Inside logo is a registered trademark and i486 is a trademark of Intel Corporation. Dell discloses proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

Mozart 3.2 client/server development tool is ready for NT

BY KELLEY DAMORE

ATLANTA — Mozart Systems Corp. unveiled at Comdex last week its client/server tool that supports both Windows NT and the Win32 platform.

Mozart 3.2, which will be released as soon as NT ships, enables front-end development on NT client/server applications. The company has been working with Pacific Gas & Electric Co. to create an NT client/server application. Their customer information service processes 1 million transactions per day at a rate of 50 to 200 transactions per second. The in-

formation system consists of 24 subsystems and 216 dialogs. PG&E officials said.

"With enterprise client/server, we were able to deploy the system for 95 percent under the original budget estimate," said Al Simila, manager of PG&E's systems construction and integration.

In addition to supporting NT, Mozart 3.2 has new functionality for creating graphical screens. In particular, it supports multiple fonts and a floating palette function.

With a single compiler, Mozart developers can build applications and run them under DOS, Windows 3.x, OS/2, and Windows NT, officials said.

On the back end, the tool supports Oracle, Gupta, SQL Server, and SQL Server for Windows NT.

Mozart 3.2 will cost \$6,000 for a development environment and \$500 per user for a run-time license. Customers can purchase the package with project or enterprise licenses, company officials said.

Mozart Systems, in Burlingame, Calif., can be reached at (415) 340-1588.



IBM, Phoenix pact lets clone makers license joint BIOS

BY ED SCANNELL

Hoping to cut the time and money it takes vendors to deliver IBM-compatible systems, IBM and Phoenix Technologies Ltd. jointly announced a BIOS licensing program and products.

The SurePath BIOS licensing program lets clone makers gain access to IBM's PC software compatibility interfaces to produce systems conforming to PC AT and Micro Channel Architecture (MCA) designs.

The software interface is made up of key elements such as IBM's BIOS and hardware compatibility interfaces, as well as the Setup Utility for both the MCA and PC AT bus designs.

With OEMs spending less time and money producing PC AT and MCA systems, users benefit by getting more capable machines for less money, executives from both companies said last week.

"Making our BIOS, both present and future, available is another important step in lowering costs [of systems] to end-users, since this is a quicker way of ensuring compatibility," said Humberto Cordero, IBM personal systems group director of OEM and technology licensing.

But some observers do not expect IBM's clone competitors to knock doors down to get the code. Only a few hardware vendors have brought MCA clones to market, most with marginal success.

Still, IBM and Phoenix believe there will be a revived interest in MCA with the time and money barriers removed.

"Not having an IBM-endorsed BIOS [for MCA] has been one of the biggest inherent barriers," said George Adams, Phoenix's vice president of business development.

The companies have jointly developed a new version of IBM's BIOS that offers more flexibility for today's faster chip sets and better support for modular structures that can be rapidly deployed to new hardware platforms, Adams said.

IBM will deliver the first systems that use the SurePath BIOS by the end of the year, Cordero said.

Another part of the program is a suite of software programs that let OEMs test for compatibility with the SurePath BIOS standard. Both companies will evolve the SurePath PC specification to support other technologies, including EISA.



Crunch numbers without a spreadsheet.

COMING JUNE 28.

'The check is in the modem,' as Einstein pays the bills

BY JIM HAMMETT

ATLANTA — National Payment Corp. introduced here at Comdex last week a communications and encryption module for users to make electronic payments.

The company also announced plans to provide a payroll tax deposit service covering all federal, state, and local taxing jurisdictions by the end of this year.

The module, called Einstein, will be available in June for DOS and Windows and can be seamlessly integrated into any existing accounting software application. It will not require users to exit the program to initiate electronic payment transactions, said Tim Tracey, National Payment Corp. president.

"The encryption routines in Einstein are designed to keep sensitive payment information confidential and safe from unauthorized access," Tracey said, adding that changes in the code can be made on the fly through NPC.

Users also will not have to worry about modem settings to send electronic payments, a problem that has proved time-consuming.

"Once installed, Einstein can find a

modem on any PC port, determine its speed and settings, and adjust the needed communications parameters automatically," Tracey said.

Einstein will be capable of sending more than one file at a time, saving costs on individual transaction calls. "Users can simultaneously transmit their direct deposit, electronic collection, and payroll tax information with a

few keystrokes," he said.

Einstein's two-way communications will provide users with an on-line confirmation of all information received when making electronic payments. Also, users can request that order forms for products or supplies be downloaded.

For electronic payments, the module will be backward compatible with its NPC-Pay for DOS and Windows file

formats.

A Macintosh version of Einstein is expected to ship later this year.

An NPC electronic developer kit is available and comes with an unlimited license for \$20 per operating platform. A Macintosh and Unix SDK is expected by year end.

National Payment Corp. is in Tampa, Fla., at (813) 222-0333.

QuickDraw fortifies Mac color artists with infinite tools

BY TOM QUINLAN

Developers will finally get their hands on a version of QuickDraw GX from Apple Computer Inc., as a beta developers' kit was released at Apple's WorldWide Developers Conference in San Jose, Calif., earlier this month.

Although an estimated 250 companies have been working with Apple to develop the beefed-up drawing module within the Macintosh OS, Apple is delivering the software to a wider audience.

QuickDraw GX puts a number of advanced drawing tools (such as Bezier curves), shapes (such as rectangles and circles), and typographic tools directly into the operating system.

Apple is also using QuickDraw GX to enhance its support for color graphics.

In all, more than 500 new routines dealing with graphics, color, and type have been added to the software module, Apple executives said.

Introduced more than a year ago, QuickDraw GX is designed to increase the basic functionality of all Macintosh programs, said David Nagel, Apple senior vice president of the Macintosh software architecture division.

Graphics software developers will no longer have to develop their own libraries of graphics primitives for more complex drawings, color support, and TrueType, and Adobe Type 1 rasterizers will also be directly supported within QuickDraw GX.

At the same time, Apple announced QuickTime for Windows 1.1 with support for Apple's Compact Video code, which enables users to play back QuickTime movies faster in larger windows.

A developers' version will be available this week, the company said.



YOU DON'T WALK AWAY FROM

PRESENTING INTERACTIVE UNIX 4.0

When the INTERACTIVE™ UNIX® System for personal computers was introduced in 1987, it quickly became a classic. Suddenly operations from video stores to Bridgestone/Firestone® production lines had a reliable, stable operating system ready for mission-critical applications. It's still among the most cost-effective multiuser operating systems available and a dream to install and administer. In fact Open Systems Today called it "...a masterpiece of good design". Today over 500,000 users enjoy its benefits. But time marches on, and even an industry-tested classic



FOR A LIMITED TIME*, ALL MULTIUSER INTERACTIVE UNIX 4.0 ORDERS WILL INCLUDE A FREE COPY OF FASTBACK PLUS™ (A

© 1993 Sun Microsystems, Inc. SunSoft, the SunSoft and SunSoft logo are trademarks or registered trademarks of Sun Microsystems, Inc. INTERACTIVE is a trademark of INTERACTIVE Systems Corporation. UNIX is a registered

Ecco Professional PIM can group data to suit your needs

BY JIM HAMMETT

A proprietary database in Arabesque Software Inc.'s Ecco Professional personal information manager lets users organize, cross-reference, and categorize information in a variety of ways.

Ecco includes a phone book, calendar, and to-do list and gives users the ability to gather information from those features

and view the data in one place. (See First Look, page 98.)

A feature called Shooter lets users import information from other applications and bring it into one location to find relationships or associations among the information, the company said.

Pete Polash, Arabesque cofounder and president, said the added features in the PIM are designed to speed up the deci-

sion-making process.

Ecco includes a number of vertical market templates such as time management, legal, project management, sales, and research, Polash said.

Ecco includes a number of tools, including drag-and-drop folders, named filters, a customizable tool bar, auto-save, auto-backup, and full Object Linking and Embedding client support.

The application also offers support for leading electronic mail protocols, including Vendor Independent Messaging (VIM) and Messaging Applications Program Interface (MAPI), and can run on major network platforms, including Novell Inc.'s NetWare and Microsoft Corp.'s LAN Manager and Windows for Workgroups, so users can make outlines and folders available to other network users.

The company is also developing a workgroup version of Ecco.

Available in June, Ecco will be offered through resellers for a 90-day introductory price of \$99. Thereafter, the suggested retail price will be \$395.

Arabesque, in Bellevue, Wash., can be reached at (206) 869-9600.

A GREAT IDEA. YOU EVOLVE.

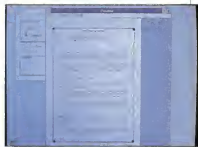


deserves a superior upgrade. Hence, INTERACTIVE UNIX 4.0 — with new power features that improve system functionality and peripheral support, making it perform better than ever. It still runs over 2,000 applications including RealWorld Accounting Software®, Informix® and WordPerfect®. And now it runs more SCO applications because it's iBCS2 compliant. What's more, INTERACTIVE UNIX 4.0 is backed by SunSoft, the leading supplier of 32-bit UNIX operating systems. Fact is, INTERACTIVE UNIX 4.0 is even better at doing what the industry classic has always done so well: improving the performance of your computing system at a lower cost per seat. Nothing revolutionary. Simply evolutionary.



\$399 VALUE). IT'S THE INDUSTRY'S FASTEST UNIX BACKUP SOFTWARE. FOR MORE INFORMATION, CALL 1-800-227-9227.

©1993 SunSoft Systems Laboratories, Inc. All other trademarks and registered trademarks are the property of their respective holders. Open Systems Task Force April 13, 1992. *Actual purchase by December 31, 1992.



TextBridge, a \$99 OCR package, can recognize any typeface on documents such as photocopies and faxes.

Xerox integrates OCR innovations into \$99 package

Xerox Imaging Systems Inc. last week introduced an optical character recognition (OCR) package for Windows that costs \$99, about one-fourth the cost of existing OCR programs.

TextBridge uses technology developed at the Xerox Palo Alto Research Center and includes innovations such as a lexifier and automatic segmentation feature.

The lexifier automatically identifies and recognizes certain known patterns, such as social security numbers and postal codes.

Automatic segmentation lets the program read the order of text on a complex page regardless of columns, images, or captions dispersed within the text. The package includes a Windows Dynamic Data Exchange interface, enabling users to access TextBridge while working in other applications.

TextBridge also has a macro that lets a Microsoft Word user activate the program through the file menu without leaving Word and scan and recognize pages.

The software supports most scanners and accepts TIFF files from most fax/modem software. It will automatically detect a skewed page and correct the orientation by up to 5 percent rotation, officials said.

TextBridge, available through Xerox Imaging Systems, will ship in June.

The Peabody, Mass.-based company can be reached at (800) 248-6550.

—Kelley Damore





Window Manager / Brian Livingston

Windows developers are getting the whole gang involved

More and more Windows applications are emulating Microsoft Corp.'s habit of including hidden screens that show the names of programmers and others who worked on the products. These displays — often quite colorful and ani-

mated — are called "credit screens," "gang screens," or "Easter eggs" (since you must hunt to find them). I revealed in my April 6, 1992, column (the day Windows 3.1 shipped) how to raise Microsoft's credit screen. For those who missed it, you click Help About in the Program Manager, then hold down Ctrl and Shift while you double-click the

Windows logo in the upper left corner of the About box. You must go through this whole procedure *three times* before you see an animation of Bill Gates or some other Microsoft character pointing at a scrolling list of developers' names.

The new PC Tools for Windows, which shipped March 15, has an undocumented feature that is similar to this. From the

PC Tools Desktop application, click Help, then About Desktop. Hold down Ctrl-Shift and double-click *both* mouse buttons on the Desktop icon at the same time. It sometimes took me three or four tries to get my mouse fingers coordinated well enough to make this work. But you only need to do the procedure once to see a window full of fireworks and the names of developers and support staff.

Central Point Software Inc., the publisher of PC Tools, has added a few nice wrinkles to the gang screen scene. Double-clicking the screen makes it jump to the next scrolling section (to more quickly show your name to an impatient mom). Clicking once makes the fireworks seem to emerge from the area of the screen you clicked. And clicking once with the *right* mouse button makes the fireworks appear to emerge at random from the whole window. Thanks to Dennis Frazier of Pasadena, MD, for his help with this trick. (For information on PC Tools for Windows, call [503] 690-8088.)

CorelDraw 3.0's credits screen is also accessed through the Help>About box. Hold down Ctrl-Shift while you double-click the balloon logo. In the next window that appears, hold down your left mouse button, and a hot-air balloon rises with a banner listing the gang.

But the new CorelDraw 4.0, which hasn't even been released yet, will have the best Easter egg of all. In the Help>About box, you don't have to hold down Ctrl-Shift anymore — just double-click the balloon. Hold down your left mouse button to make the hot-air balloon rise. Then click your right mouse button a few times and *Flying Elvises* come parachuting out of the sky. This is reminiscent of Corel Systems Corp. hiring actual skydiving Elvis impersonators for fall Comdex. Because these screens are so much fun to watch, I wish developers would simply put a Help Credits item on their menus. The names are always abbreviated (to keep pesky headhunters off the phones), so letting us see them couldn't hurt.

UPDATES. I wrote on May 17 that Microsoft's CD-ROM Extensions, MSCDEX.EXE, could not be removed from memory once loaded.

I have since learned that Online Computer Systems Inc. sells CD-ROM server software called OptiNet, with a client module that can load and unload MSCDEX at will. Pricing varies by network, with a 100-user licensor priced at \$1,495, including all server, client, and MSCDEX licenses. Contact Online at (800) 922-9204 or (301) 428-3700.

I wrote on May 24 about a product that allows you to switch between a mouse and a pen interface without restarting Windows. If you already use a Wacom or CalComp tablet, you can get a driver in Fractal Design Corp.'s Paint application that does the same thing (\$299 from Alexander & Lord, [800] 647-7443). Wacom owners can get this driver free by calling (206) 750-8882 or by dialing (408) 982-2737 with your modem and downloading WACOM.ZIP.

Brian Livingston's new book is *Windows Gammas* (IDG Books). Send tips to: ComputerServe 70053,2035; MCI 420-0583; Internet 420-0583@gmci.com; or fax (206) 282-1248.

IN FOCUS

ROBERT X. CRINGELY

Columnist, "Notes From the Field"

Profile: Former war correspondent, Stanford

University professor, hack writer. Sex symbol. Fired by several pioneering PC companies. Author of *Accidental Empires*:

How the Boys of Silicon Valley Make Their Millions, Battle Foreign Competition, and Still Can't Get a Date. Speaks widely and semicoherently on the state of the PC industry.

Writes *InfoWorld's* "Notes From the Field," a column of industry secrets and philosophy.

Cringely on computer gossip: "I don't like that word, because a lot of gossip is wrong. I prefer to talk about 'little-known facts.' And those facts, however sketchy, can be very important to an IS manager ready to buy 5,000 copies of a new application, or 5,000 new PCs. Does the stuff really work? Will the price drop next week? Is a better, faster product going to ship the week after next? Is the vendor about to go out of business? Jobs are at stake here, and *InfoWorld's* readers need all the information they can get before making their buying decisions."

On engineers: "Techies are my best sources. That's because companies lie, bosses lie, but engineers are generally incapable of lying. Most engineers won't even tolerate it when others in their companies lie, which is why I get so many calls from embarrassed or enraged techies undertaking what they view as damage control but their companies probably see as sabotage. I love engineers."

On writing a weekly column: "This business is moving so quickly that readers need a weekly newspaper. The column they read on Monday left my fingers on Friday morning. Monthly or bimonthly publications are set in stone weeks before they appear. DOS 6.0 could go through three betas in that time. If your career depends on this stuff, then you need the latest information. And of course, I need the money."

The Voice of Personal Computing in the Enterprise

**INFO
WORLD**



Introducing **ObjectView® 2.0.**

The client/server development tool that does more, is easier to use, and costs less.

Guaranteed.

Discover the power of ObjectView 2.0 now for Knowledge is power, and at the heart of knowledge is information. The power to perform at the peak of potential depends on the ability of your enterprise to access and manage information quickly, flexibly and simply, from any desktop.

Which is why ObjectView 2.0 from KnowledgeWare is arguably the most powerful Windows-based tool available for creating mission-critical client/server applications ranging from decision support to on-line complex processing. ObjectView 2.0 combines power with an intuitive interface and an open architecture that supports a wide range of databases and products. So your company can reap the benefits of client/server today.

Save \$1,800

with this no-risk offer

If you've ever considered the move to client/server or even if you're using another product, you owe it to yourself to take advantage of this offer.

Because for a limited time we're offering ObjectView 2.0, regularly \$2,799, at an introductory price of just \$999. Try it risk-free for 30 days. Your satisfaction is guaranteed or we'll refund the sale price. But we're confident you'll be impressed by ObjectView 2.0, and here are just some of the reasons why:

Power without complexity

What good is power if you can't put it to work? ObjectView 2.0 has the built-in intelligence to access up to eight relational databases

from a single application. The unique panel object gives developers unmatched flexibility to design interfaces independent of underlying databases. A spreadsheet object and built-in business graphics enable end users to calculate, analyze, format and incorporate all types of graphs, all without exiting the application or the burden of buying new software.

Development at warp speed

With ObjectView 2.0, you're able to deliver what users want, fast. Get a headstart with ObjectView 2.0's automatic application developer. Then iteratively develop applications based on user reactions to actual screens. Further customize applications with flexible scripting power: high-level commands, enriched BASIC, C or C++. Finally, depend on an interactive debugger to tweak final applications, even at the SQL level.

Our open-door policy

ObjectView 2.0 supports all major databases and gateways.

Work with controls and libraries, report writers, source code managers, version control products and CASE products, including KnowledgeWare's Application Development Workbench® and Flashpoint®.

ObjectView is backed by KnowledgeWare's experience in servicing, enhancing, and integrating software tools.

More than 4,200 companies worldwide use our products for developing

applications and depend on our complete range of consulting, training, and support.

You make the call:

Order ObjectView 2.0 at

1-800-295-0570

With a major credit card, you can order ObjectView 2.0 risk-free over the phone. Our operators will even tell you how to order with a check or purchase order. But call now to take advantage of our limited \$999 introductory offer. And discover the power of ObjectView 2.0.



KnowledgeWare®



\$225.00

Max. Throughput:
564 kB/sec.
CPU Utilization:
59%

SMC

Elite 16

\$225

Max. Throughput:
519 kB/sec.
CPU Utilization:
76%

EAGLE
NE2000

\$129

Max. Throughput:
662 kB/sec.
CPU Utilization:
43%



EtherX N.I.C.

Kingston
TECHNOLOGY CORPORATION

\$259

Max. Throughput:
483 kB/sec.
CPU Utilization:
52%

3Com

EtherLink II

\$179.00

Max. Throughput:
537 kB/sec.
CPU Utilization:
71%

intel.

EtherExpress

OTHER ETHERNET CARDS MAY BE SLOWER BUT THEY SURE DO COST MORE.



The EtherX Network Interface Cards.

They're 17% faster than competing interface cards. They're 21% more efficient. And, they cost at least 28% less. They feature an advanced Ethernet controller and 16-bit bus master DMA for maximum throughput and minimum CPU utilization. Introducing the EtherX family of 10 Base-T, 10 Base-2, and 2-in-1 combination network interface cards from Kingston, the inside name in upgrades.

The EtherX 10 Base-T Concentrator.

The EtherX concentrator allows maximum network flexibility. With eight RJ-45 ports and an AUI connector, it's the ideal hub for every application from the smallest workgroup to the most critical enterprise-wide network installation.



**NetWare
Tested and
Approved**

Certified Compatibility.

EtherX NICs are certified by Novell Labs and are fully compatible with Novell Netware, Netware Lite, Artisoft LANtastic, Microsoft Windows for

Workgroups and every other popular network operating system.



Individual Product Testing.

Each and every EtherX product is bench tested before it's shipped. Our exclusive loop-back transmit/receive test suite evaluates each card 32 times to assure data integrity. This rare quality control process leads to years of reliable service.



Kingston Reliability.

EtherX users enjoy the same reliability customers have come to expect from Kingston memory and processor upgrades. Every product is individually tested prior to shipping, sup-

ported by free comprehensive technical assistance and backed by a five-year warranty.

More Information.

If EtherX sounds like your network solution, contact your nearby Kingston dealer or give us a call at (800) 435-2620. We'll be happy to answer your questions about EtherX or any of our other 625 upgrade products.

[800]

Kingston
TECHNOLOGY CORPORATION

THE INSIDE NAME IN UPGRADES

17600 Newhope Street, Fountain Valley, California 92708 (714) 435-2600 Fax (714) 435-2699

All Trademarks, Registered Trademarks and Logos are of their respective holders. Retail prices are as of January, 1993. Kingston and Kingston Technology are Registered Trademarks of Kingston Technology Corporation.

NEWS / HARDWARE

PIPELINE

PRICE CUTS

Apple pares prices on two of its printers

Apple Computer Inc. has lowered the list prices of two of its printers by nearly 33 percent. Prices for the Apple Color Printer dropped by \$690 to \$1,659. The ink-jet printer offers 360-dot-per-inch output and prints on paper as large as 11 inches by 17 inches. The Personal LaserWriter NTR, Apple's four-page-per-minute laser printer previously priced at \$1,649, will now retail for \$1,179. (800) 767-2775.

Tandberg Data Inc. has cut prices for its quarter-inch tape and Panther series of tape backup devices by as much as 48 percent. A 1.2-gigabyte Panther drive designed for use in Unix environments is now priced at \$1,425. (805) 495-8384.

VidTech Microsystems has cut prices on its FastMap and Graphix graphics accelerator boards by between \$30 and \$100. The XGA-compatible GraphixMax boards are now priced from \$349 to \$499. The VL bus-based FastMap boards list for \$199 to \$219. (800) 752-8033.

BUNDLES

IBM ThinkPad 710s get Windows Pen OS

The IBM ThinkPad 710 tablets and future IBM tablets will offer Windows for Pen Computing in addition to other operating environments, thanks to an agreement between the IBM Personal Computer Co. and Microsoft Corp. Other operating systems offered on ThinkPad tablets are Go Corp.'s PenPoint, Grid Systems Corp.'s PenRight, and Communication Intelligence Corp.'s PenDOS.

SHIPPING

Dauphin's lightweight portable shipping

Dauphin Technology Inc. has begun shipping its hand-held DTR-1 computer. The 2½-pound computer uses Windows for Pen Computing and will run standard Windows applications. IBM manufacturers the computer for the Lombard, Ill., company. The \$2,495 base unit includes a fax/modem, a Cyrix Corp. 486SLC processor, 4MB of RAM, and a 20MB hard drive. Options include an additional 2MB of RAM, a 40MB hard drive, and an external 85MB removable cartridge drive. (708) 971-3400.

Continued on page 34

IBM ValuePoints get multimedia additions

By CATE CORCORAN

ATLANTA — Multimedia is moving into the mainstream at IBM.

The company has added double-speed CD-ROM drives and 16-bit sound cards to its desktop PC ValuePoint systems, making them compliant with the MPC Level 2 specification announced last week. (See related story, page 35.)

The new Multimedia for PS/2 ValuePoint (MVP) series brings sound and CD-ROM for the first time to IBM's mass-market PCs, which run DOS and Windows. IBM expects the machines to catch on with businesses running training and kiosk applications. The double-speed CD-ROM drives will let users display large 16-bit color images, said Hugh Dyar, IBM multimedia brand manager.

Since 1991, IBM has offered multimedia functions on its PS/2s, but these were available only on OS/2 software and Micro Channel buses.

Now users can buy multimedia machines for \$450 extra in-

stead of the \$1,000 extra that multimedia PS/2s cost, IBM officials said.

The MVP systems come in three versions for the business and home markets.

The business systems, called Office, come without displays, speakers, or microphones, so users can customize according to their applications, Dyar said.

A basic Office system with 16MB of RAM, a 25-MHz 486SX processor, and a 120MB hard drive is priced at \$1,800.

At the high end, an Office system with a 33-MHz 486SX2 and a 340MB hard drive is priced at \$3,100.

IBM also said it will ship voice-command software called Voice Type Control for Windows, which is expected to be priced at less than \$100 at the retail level.

Other announcements made by IBM last week at spring Comdex include a pre-installed fax/modem and other software for its ThinkPad portable PC, as well as new servers. The new software for the PS/2 Model 9585, OS/2 servers come with OS/2 LAN Server 3.0 Entry; DOS 5.02 servers come with NetWare from IBM Version 3.11 for Token Ring and Ethernet.

The same software for ValuePoint servers will ship next month, the company said.

IBM headquarters in Armonk, N.Y., at (800) 426-2968. The IBM Multimedia Information Center can be reached at (800) 426-9402.

— Ed Scannell contributed to this story.

IBM is bringing devices such as sound boards and CD-ROMs to its ValuePoint line.

A glossary of PCMCIA terms

Type I

The thinnest PC card at 3.3mm thick. It is used for memory enhancements, including RAM, Flash, SRAM, and EEPROM.

Type II

A 5mm thick card. This size card is usually used for modems, LAN adapters, and host communications cards. It is the most common slot on shipping notebooks.

Type III

A 10.5mm card. These cards are used for devices that need more space, including disk drives, and wireless communication devices.

Card Services

The software layer that coordinates access to PC cards, the sockets themselves, and the system resources.

Socket Services

The software layer directly above the hardware that provides a standardized interface to manipulate the cards, sockets, and adapters.

Versions

Version 1.0 was released September 1990 with only hardware specifications. Version 2.0, issued the following September, added software allowing for input and output cards (modems, disk drives, etc.). Release 2.01 contains typographical corrections and no new technical specifications.

SOURCE: PCMCIA

PCMCIA spec debated

Group doesn't want 16mm cards

By YVONNE LEE

The Personal Computer Memory Card International Association is debating with notebook manufacturers about whether to develop a new specification for thicker notebook peripherals.

The group wants to discourage memory card makers from creating cards thicker than the current 10mm Type III specification while allowing system manufacturers to use larger slots, said Tony Wutka of IBM, chairman of the PCMCIA technical committee.

"Card manufacturers would take the easy way out and avoid miniaturization," Wutka said. Cards larger than even Type II will not fit in most notebooks, he said.

Toshiba America Information Systems Inc. calls the 16mm slot on its T4600 notebook a "Type IV," but association members say the group is unlikely to adopt a Type IV specification.

"They're talking about it, but they have definitely not started work on it," said Nelson Chan, director of marketing at Sunk-dis Corp. and a PCMCIA executive member.

The Japanese Electronic Industry Development Association standard on which PCMCIA is based does include a 16mm specification. Wutka said. Although peripheral makers are developing to the larger slot, only Toshiba has announced a machine with a 16mm opening.

Customers who buy computers with larger-than-standard slots will still be able to use standard cards.

"We already have options coming for that slot," said Ron Smith, Toshiba senior product manager. The company will release in July a modem it developed with IBM that has two built-in RJ-11 jacks, he said.

Disk drive manufacturers may also use the larger slots to create multiplatter hard drives.

Epson rolls out graphics PCs and enters the notebook market

By SHAWN WILLET

ATLANTA — Epson America Inc. showcased PS/2 tailored for graphics applications and two notebook computers here at spring Comdex last week.

The Progression 4 PC includes a graphics chip set on the motherboard to boost performance.

"With the Wینگline [chip set], the system doesn't have to go

through a video controller to access the VRAM [video RAM], so it skips a step," said an Epson representative.

The Progression 4's virtual cache also boosts performance above local bus implementations, Epson said.

The PC uses Intel Corp.'s 33-MHz 486SX, 50-MHz 486X, or 486DX2/66 chip. Epson's cat-

alog will sell the product under the name Endeavor 4.

Epson also entered the notebook market with the ActionNote 4000, a full-sized model, and the ActionNote 4000, a sub-notebook.

The ActionNote 45LC/25 weighs 5½ pounds and uses the 486SLC chip that runs at 25 MHz.

The ActionNote 4000, shipping in July, weighs 3.8 pounds and has two PCMCIA slots.

The company also announced pending ship a PC handled with Next Computer Inc.'s NextStep. The Progression 4 and Endeavor 4 start at \$1,339, and the ActionNote 45LC/25 starts at \$1,400. Pricing has not been set on the ActionNote 4000.

Epson, in Torrance, Calif., can be reached at (800) 289-3776.

HP Disk Array provides secure storage for servers

BY TOM QUINLAN

A new EISA-based disk array from Hewlett-Packard Co. is designed to offer users a moderately priced storage solution.

The HP Disk Array can accommodate as many as five SCSI drives of 510MB or 1-gigabyte capacities.

Designed to be used in HP's recently announced NetServer line, whose internal capacity is limited to five drives, HP will also be selling the product as an external add-on for servers from other hardware manufacturers.

Although HP is providing an EISA-based controller for the array, the drives themselves are Fast SCSI-2 devices that can support data transfer rates of 10MB per second.

The EISA controller was used to reduce the cost of the system.

HP officials said, but the array cannot be used as a standard SCSI device.

The HP Disk Array supports RAID Levels 0, 1, 5, and 6.

Level 1 is disk mirroring, and Level 5 supports features such as disk stripping.

Level 6 is a nonstandard RAID definition that lets the system automatically switch to a "hot spare module" if one of the drives starts to go bad.

Prices for the system, which HP expects will meet or beat those of its competitors, range from \$8,849 for a three-disk system with a RAID Level 5 storage capacity of 1 gigabyte to \$14,899 for a five-disk array with a Level 5 storage capacity of 4 gigabytes.

The system will start shipping June 1 and will be sold through computer specialty stores.

Striking 486 PC preserves desk space, users' eyes

BY YVONNE LEE

ATLANTA — The APF4000 desktop computer line beckons the Sharper Image buyer, combining unusual looks with compact size and a no-strain screen.

APF's futuristic-looking black computer has a 10.2-inch active-matrix color display and a 9-by-10-inch footprint.

It is being marketed to businesses where space is at a premium. But most of all, APF is selling the computer's look.



Its unique look is the main selling point for the \$5,995 APF4000.

"You pay \$1,000 more for a milk coat vs. a cloth coat," said Sue Priester, a company representative.

Priester also pointed out that telephones were once simple utilitarian tools but now come in variations including Mickey Mouse.

On a more utilitarian level, the computer's flicker-free LCD screen does not emit low-frequency radiation or produce the eyestrain that standard monitors do. It displays 64,000 colors and is larger than the flat-panel screens found in most notebooks.

The \$5,995 APF4000 features a 66-MHz 486DX2 processor and has a 170MB hard drive, floppy drive, a PCMCIA Type II slot, and 4MB of RAM expandable to 32MB.

At 4,900 APF4000 includes all of the 4900's features, plus a PCMCIA Ethernet or Token Ring adapter. The company also sells the enclosure and screen alone for \$4,495. All products are shipping now.

APF, in Greenville, S.C., can be reached at (803) 244-4416.

rate of 76 hertz.

It comes with 1MB of video RAM and accelerates Windows consistently in all supported resolutions and refresh rates, according to the company.

Like all Windows accelerator cards, the VGA Wonder GT

Star shows dry ink-jet color

Lowers price, raises quality of low-end color printing

BY KELLEY DAMORE

Star Micronics America Inc. last week brought a color printing technology to the market that may whittle away at the dominance of Hewlett-Packard Co. and Canon U.S.A. Inc. in the low-end color printing arena.

The \$599 SJ-144, which prints at 382 characters per second and at a resolution of 360 dots per inch, is based on a heat fusion technology that fuses a polyester substance onto the paper.

Because the ink is not absorbed into the paper, making it a dry process, the printer offers more vibrant output, said analysts and company officials.

In a wet process, such as ink-jet, ink is absorbed into the paper. This causes problems such as smearing and feathering, where the text and graphic edges are ragged because the wet ink has soaked into the paper's fibers.

"When the ink absorbs into the paper, it gives it a flat look," said Rob Auster, vice president of electronic printing for BIS Strategic Decisions, a market research firm based in Norwell, Mass.

An analysis said that the vibrancy of the color was as good as color thermal output.

"It has great quality and great color," Auster said. "At \$500,



Using a technology known as heat fusion and polyester ink, the \$599 SJ-144 could challenge low-cost ink-jet printers.

this printer is going to be very influential."

The printer comes with eight bit-mapped fonts and 15 scalable TrueType fonts. Its paper handling features include an automatic paper tray with 30-sheet capacity.

The device can print on a variety of paper types, including transparencies and envelopes.

The printer supports Epson LQ-860, NEC 24-wire graphic commands, and the IBM Printer X24E emulations.

Star Micronics has incorporated its proprietary Compressed

Data Mode, which accelerates the transfer of information from the user's PC when printing TrueType fonts and graphics with Windows 3.1 applications.

The printer also offers a zoom mode that can reduce the size of any text or graphic.

Star also provides a two-page mode that lets the user print two pages of data on a single page.

The color printer will be available in July through dealers and distributors.

Star Micronics, based in New York, can be reached at (212) 986-6770.

Matrox boards out 64-bit graphics card

BY CATE CORCORAN

ATLANTA — Sixty-four-bit graphics boards with optional laser-printing acceleration, video encoding, and Video for Windows enhancement are now shipping from Matrox Electronic Systems Ltd.

The boards range in price from \$599 to \$1,499.

The MGA Ultima supports as much as 2MB of video RAM (VRAM) and offers resolutions as high as 1,600 by 1,200 with 256 colors. It also supports 16.7 million colors at a resolution of 800 by 600.

The MGA Impression comes

with 3MB of VRAM and supports resolutions of 1,600 by 1,200 pixels with 32,768 colors and 1,024 by 768 pixels with 16.7 million colors.

If users add 2MB of dynamic RAM to the board, it will support three-dimensional graphics. Gouraud shading and z-buffering at resolutions ranging from 800 by 600 to 1,152 by 882.

Both boards offer refresh rates as high as 80 hertz.

They are VGA compatible and support the AT, Micro Channel, and VESA Local Bus standards. In addition to work-

ing with Windows 3.1 and OS/2 Presentation Managers, the boards will support Windows NT when that product ships.

Other features include a hot-key-driven pan and zoom, a 1,600-by-1,200 virtual desktop, and dithering for high color quality in all modes, the company said.

Options include the Marvel video controller, which blends video with MGA graphics and displays the result on a multi-synch monitor.

MGA graphics boards come with a connector for a LaserPro acceleration kit, which accelerates printing by as much as 600 percent and increases print quality by as much as 200 percent, according to Matrox.

In the third quarter, Matrox will ship a VideoPro encoder, which will let users send graphics and video to a VCR.

Other third-quarter releases include versions of the MGA cards for Intel's PCI local bus and the EISA bus.

Matrox is located in Dorval, Quebec, Canada, and can be reached at (514) 685-2630.

Accelerator card offers 76-hertz video refresh at entry-level price

ATLANTA — ATI Technologies Inc. has added an entry-level card to its line of Windows accelerators.

The VGA Wonder GT will ship next month for a list price of \$199. The card will offer resolutions as high as 1,024 by 768 with 256 colors and a refresh

rate of 76 hertz.

It comes with 1MB of video RAM and accelerates Windows consistently in all supported resolutions and refresh rates, according to the company.

Like all Windows accelerator cards, the VGA Wonder GT

COMDEX

speeds up some graphics operations by offloading them from the system CPU.

The VGA Wonder GT features a built-in mouse port and can be installed and configured in software, the company said.

The card is register-level com-

patible with IBM's 8514/A graphics chip so users are not forced to run in slow VGA mode if they don't have extended drivers, according to ATI.

ATI is located in Scarborough, Ontario, Canada and can be reached at (416) 756-0718.

— Cate Corcoran



LOTUS cc:MAIL

Awards (1992-1993)

- ComputerWorld US Brand Preference
Winner, February 1992
-
- Windows Magazine WinAward, February 1992
-
- LAN Times Reader's Choice, March 1992,
January 1993
-
- InfoWorld Product of the Year, March 1992
-
- BYTE Magazine Reader's Choice, June 1992
-
- BYTE Magazine Award for
Cross-platform E-Mail, March 1993
-
- Network Computing's Certified Interoperable
Application Award, December 1992
-
- Network World's Enterprise
Technology Award, December 1992
-
- Software Digest's Highest Overall Evaluation,
8.7 Rating, 1992
-
- MacUser Editors' Choice Award, 1992
-
- MacWEEK 1992 Editors' Choice
Diamond Award, December 1992
-
- UNIX World's Best Product of the Year for
1992, January 1993



MICROSOFT MAIL

Awards (1992-1993)

- PC Magazine Editor's Choice Award
October 27, 1992

In the e-mail arena, this is what they call running up the score.

With over three million users, Lotus® cc:Mail® is overwhelmingly the e-mail of choice. In reality, there's no competition.

According to independent reviewers, cc:Mail is the fastest e-mail to learn, the easiest to use, and the smoothest to administrate.

cc:Mail's open architecture means it runs virtually anywhere on anything. Unlike other e-mail products, cc:Mail works with whatever software and hardware you have on board. Across any combination of Macs®, DOS, Windows™, OS/2®, UNIX®. Across LANs, WANs, public or private e-mail forums or unique operating systems. And cc:Mail always lets you work

in the environment you're used to.

Unlike Microsoft® Mail, cc:Mail is built for scalability. It maintains peak performance whether you connect 5 or 500,000 users.

Now that you know the score, it's time to make your call. Just dial **1-800-448-2500** for a free demo disk. And ask for the version of your choice: Macintosh®, Windows, DOS or UNIX. And see how cc:Mail can put its points in your favor.

Lotus cc:Mail

Is there anything your mainframe



Once upon a time, mainframes and networks didn't get along. They were so different, they feared each other. But now, with the upswing in downsizing, client/server and PC networks, mutual cooperation is in order. So you're probably asking: *"How can I leverage my investment in mainframe applications and data to benefit my network clients?"* Which is tough enough to say, let alone do.

We have a simple suggestion: let your big strong mainframes help your smaller networks with

NetWare + NetWare for SAA = Network-to-Host Integration

NetWare[®] for SAA[™]. NetWare

All Novell products work together. So your NetWare network is a platform to build on for years to come. That's why, now more than ever, NetWare is networking.

for SAA integrates mainframe and NetWare environments, giving DOS,

What we can do to help your network?



Windows, Macintosh and OS/2 network clients smooth access to mainframe and AS/400 applications. Including databases and E-mail. Yet it allows you to apply mainframe system management tools (like NetView) to the network. With NetWare for SAA, a mainframe can distribute software to your networks and even serve as an archive to ensure network data integrity. If you have a NetWare environment, NetWare for SAA brings the power of the mainframe to users who need it. And finally, everyone will live happily ever after.

Call us at 1-800-554-4446 for more information.

 **NOVELL.** The Past, Present, and Future of Network Computing.





You can learn more.

Find out how two industry giants, Novell and DCA, have teamed up to provide the best solutions for your network-to-mainframe connectivity needs.

Whether you're just starting to build your network-to-host environment or want to enhance or migrate current implementations, this seminar is for you!

Call 1-800-892-2922 for dates, locations and to register today!

DCA
NOVELL

NEC readies 40/80-MHz chip, kits to design systems for NT

By TOM QUINLAN

NEC Technologies Inc. has increased its support for the R4000 line of 64-bit processors originally developed by MIPS Technologies Inc.

The two companies have jointly designed a low-power R4200 processor that features power management techniques for use in portables, while maintaining the processor's 64-bit architecture.

The first chip in the low-power family will be a clock-doubling processor that operates at 80 MHz internally while interfacing with the computer at 40 MHz.

The chip is designed to run at just 1½ watts and is capable of automatically operating at levels as low as 25 percent of its normal operating frequency during periods of low activity.

NEC will be responsible for manufacturing the processor, which was developed jointly by NEC and MIPS.

Samples of the chip will be available by the end of the year, the companies said.

NEC has also developed manufacturing kits that include its chip set to help manufacturers design MIPS-based systems for running Microsoft Corp.'s Windows NT.

Dated the ARC100 and ARC150, the Advanced RISC Computing-inspired design consists of two MCT-DP data path controllers, an MCT-ADR address path, and a system control logic chip.

The MCT-ADR chip also includes the system's memory controller, bus interface, and video controller.

Together, the three chips will be sold for less than \$100, NEC said, when purchased in quantities of 10,000. Those chips are shipping now.

The design kits are expected to ship in July and will carry a price of \$5,000.

NEC will also develop and market products that conform to Acer America Inc.'s PICA chip set, which is also being used as a design point for desktop MIPS-based systems designed to run the NT operating system.

PIPELINE from page 29

SHIPPING

APS offers hard drive option for Apple's LaserWriter Pro

Hard drives for Apple's LaserWriter Pro 630 are now available from APS Technologies. The 2½-inch drives use the SCSI controller that is included with the printer and range in capacity from 80MB to 160MB. Prices will vary between \$349 and \$549. APS is also offering a \$69 bracket kit, the APS LW Pr-Kit, for users who have upgraded their PowerBook 2½-inch drives and want to use the original drives in the LaserWriter Pro 630. (800) 235-2753.

A 698MB, 3½-inch hard drive from Micropolis Corp. offers a data transfer rate of as fast as 10Mb per second. The Fast SCSI-2 Model 2108 has a list price of \$1,995. (818) 709-3300.

Bitstream Inc. of Cambridge, Mass., recently debuted a font collection for the Hewlett-Packard Co. LaserJet 4L. Called My First Font Pack for the HP LaserJet 4L Printer, the package includes 10 scalable Bitstream text and headline typefaces. Priced at \$12.95, the package is available immediately. (617) 497-6222.

ANNOUNCED

Apple's "Big Brother" ad makes Russian comeback

For those users who might have missed the one and only American presentation of Apple Computer Inc.'s "1984" commercial that introduced the Macintosh, there's still hope. Apple is dusting off the Big Brother-themed commercial, rewriting the voice-over, and presenting it to a new audience that can probably identify with it: Russians.

The PowerPC chip continues to gain overseas converts as three more European companies have committed to supporting the chip. Norway's Tandberg Data Systems will use the PowerPC in its next gen-

eration of desktop systems, while Germany-based Chorus Systems and MacroTek GmbH will develop products that support the processor.

Micropix Systems Ltd. of Vancouver, British Columbia, Canada recently introduced a new version of its print server line. The M200 and M201 models can support IPX/SPX and TCP/IP platforms. The printer servers feature SNMP management, allowing a network administrator to remotely monitor printer performance. Priced at \$1,995, the device will ship in July. (800) 665-7798.

Diamond Computer Systems Inc. has announced that it will ship a Peripheral Component Interface local bus version of its Viper Windows accelerator board in the third quarter. The Viper PCI, which is based on Witek Corp.'s Power9000 chip, is designed to work with the Pentium processor and will support resolutions of 1,280 by 1,024 with 256 colors. The card will list for \$649. (408) 736-2000.

Canon Computer Systems Inc. announced this week a bubble-jet printer that can print on 11-by-17-inch paper. The BJ-230 prints at 360-dot-per-inch resolution at speeds of 248 characters per second in high-speed mode. The \$549 printer offers seven resident fonts. (800) 848-4123.

FINANCIALS

Dell is selling more, but its profits dropped sharply

Revenues for Dell Computer Corp.'s first quarter of fiscal 1994 grew by 89 percent when compared to the year-earlier quarter, but that its low earnings to poor performance in the notebook market. Delayed and canceled notebook projects cost Dell \$20 million in pretax income.

Media Vision rolls out MPC 2 upgrade kits

By CATE CORCORAN

Following the announcement of the MPC Level 2 specification, Media Vision Inc. began shipping MPC Level 2 upgrade kits last week.

The Pro 16 Multimedia System and the Fusion Double CD-16 upgrade kits include Media Vision's Pro AudioSpectrum 16 sound card and double-speed CD-ROM drives from NEC Technologies Inc.

The Pro 16 kit lists for \$1,199 and comes with a faster CD-ROM drive and more software than the Fusion Double kit, which lists for \$799.

Both drives send data across the bus at 300KB per second, but the Pro 16 drive has a data access rate of 250 milliseconds, vs. the 350-millisecond rate of the drive provided with the Fusion Double kit.

The Pro 16 kit includes MIDI sequencing software, a wave-form editor, a sound mixer, voice-recognition software, and software that enables the CD-ROM drive to play audio CDs.

The kit also includes reference materials and games.

The Fusion Double kit comes with Compton's Interactive Encyclopedia and three games.

Last week, Media Vision acquired a three-dimensional graphics company, Pellucid Inc., which was started by former employees of Silicon Graphics Inc., a company known for its 3-D graphics workstations.

The company will become the Visual Technology Group with-in Media Vision and will work on bringing 3-D animation and high-resolution (1,024-by-768) 24-bit graphics to a broader PC market, said Satish Gupta, Media Vision vice president of strategic marketing and development.

The group will develop chips and boards. Its first products, add-in boards, will ship early this summer, Gupta said.

At some point the group will combine Pellucid's graphics with Media Vision's motion video in one board, Gupta said.

Media Vision will continue to support Pellucid's installed base, Gupta said.

Media Vision, in Fremont, Calif., can be reached at (800) 348-7116.

LaserMaster introduces large-format color printer

By KELLEY DAMORE

For users interested in printing large-format documents, LaserMaster Technologies Inc. may have an affordable solution.

The company recently unveiled a digital color printer that can print on paper 36 inches

wide. It is PostScript Level 2 compatible using PCLinc Associates Inc.'s PowerPage interpreter.

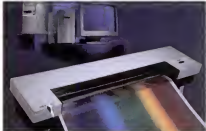
HP-GL/2 is also included and the printer can sense the appropriate page description language. Color matching and image enhancement technology are also included.

Available for both the Macintosh and PC, the DisplayMaker includes Ethernet (EtherTalk) and TCP/IP, LocalTalk, and parallel and serial ports. LaserMaster's HotPorts technology switches between ports to print all files in the order received.

The Color Server includes 48MB of RAM, upgradable to 256MB. A proprietary 66-MHz 32-bit processor, floating-point unit, and a 264KB fast cache are included.

The printer has two resolution modes: 300 dots per inch (dpi) and 150 dpi for proofing. It ships with 235 Type 1 typefaces on a 220MB internal hard disk.

LaserMaster, of Eden Prairie, Minn., is at (800) 688-8342.



The DisplayMaker lets users print on oversized paper at a relatively modest price.

wide and 110 inches long.

LaserMaster's DisplayMaker Digital Color Printer should make these capabilities more affordable, as it will ship in June with a list price of \$17,995.

To date, printers in this market from companies such as Iris Graphics Inc. have cost between \$85,000 and \$120,000.

The DisplayMaker features a four-color ink-jet engine and a Color Server LaserMaster Pro-

Multimedia PC spec refined

MPC Level 2 recommends 486, faster CD-ROM

By TOM QUINLAN

An upgraded multimedia specification has been authorized by the Multimedia PC Marketing Council that calls for a 486 processor and a double-speed CD-ROM drive.

At the same time, the MPC trademark, which designates that the system meets a base level of multimedia functionality, will now be a stamp of certification as well. MPC members will have to submit their products to a testing process to make sure they comply with the MPC specifications.

The MPC Level 2 specification, although backward compatible with the original 386-based specification, recognizes that many multimedia applications require a more robust environment, said Glen Ochensreiter, general manager for the marketing council, which holds rights to the specification.

At a practical level of performance, that an MPC Level 2 system is designed to support is the capability to show digitized video in a 320-by-240 window at 15 frames per second.

Unlike the original specification, MPC Level 2 also recommends local bus graphics last 122 manufacturers should provide.

The MPC Level 2 specification stops just short of mandating

MPC Level 2 mandates higher performance

Reacting to faster processors, better peripherals, and the need for more power, the Multimedia PC Marketing Council has developed an extended systems specification for the next generation of multimedia PCs.

The requirements include:

- 25-MHz 486SX, or compatible
- 4MB of RAM
- 160MB hard drive
- Double-speed, multisection CD-ROM drive
- 16-bit bus
- 16-bit VGA graphics
- Local bus (not specifically required, but overall system design virtually mandates it).

ing local bus capabilities as well. However, the suggestions for MPC Level 2 system design virtually mandate it.

"We didn't want to be in the position of supporting one particular technology over another," Ochensreiter said. "That's why we didn't require something like [Peripheral Component Interface] or VESA Local Bus."

In addition to the more powerful processor, the MPC Level 2 specification calls for a double-speed CD-ROM drive capable of transmitting data at 300KB per second, or fast enough to support video.

Other additions to the Level 2

specification include 16-bit sound, a 160MB hard drive, 4MB of RAM, and a 16-bit VGA graphics board capable of supporting as many as 65,000 colors.

According to the council, more than 34 hardware vendors have licensed the MPC designation, including Tandy Corp., Zenith Data Systems, NEC Technologies Inc., and NCR Corp.

The cost of licensing the MPC sticker is \$35,000 for upgrade kit developers and \$70,000 for systems manufacturers.

Alternatively, systems manufacturers can opt to pay \$1 for each MPC system they build.

Dell adds local bus to entry-level systems

By STEVE POLLIU

Low-priced systems from Dell Computer Corp. were equipped with local bus graphics last week at no extra cost.

Dell Dimension systems, now shipping, have local bus graphics integrated on the motherboard. This boosts processor performance by as much as 67 percent and the graphics speed of systems by as much as 122 percent, said Roger Harden,

Dell's group brand manager.

The local bus implementation is the same as in Dell's more powerful Performance series, but the company reduced the manufacturing cost so it would not add to the Dimensions' price, Harden said.

The new Dimensions, ranging from a 25-MHz 486SX system to a 66-MHz 486DX2, start at about \$1,400. The cheapest model has a 4.25-by-1.70MB hard disk, 4MB of RAM, two

floppy drives and a 1,024-by-768 color monitor.

The systems are available in small footprint, midsize, and floor-standing models.

Dell also extended its ReadyWare program to include the Dimension line. ReadyWare, where applications are pre-loaded, allows customers to select from 100 software packages.

Dell is based in Austin, Texas, and can be reached at (800) 274-3355.

Product Spotlight

Miniature hard drive works with any computer

The Pocket Hard Disk from Synergy Resource U.S.A. Inc. provides a low-power way to store extra data. The drive, which is about the size of two decks of cards, snaps onto the parallel port of any computer. The drive has a pass-through socket, allowing users to connect both the drive and a printer to the same parallel port. It measures 5.8 inches by 3.0 inches by 1.1 inches and weighs just over 11 ounces.

The Pocket Hard Disk draws power from the computer via a keyboard adapter. Users can also purchase a separate rechargeable battery or AC adapter. Prices range from \$380 for a 40MB drive to \$950 for a 200MB drive. The drives are available now. Synergy Resource U.S.A. can be reached at (407) 788-6708.



Now That Notebook Fax/Modems Are Standard Equipment,



PCMCIA and the XJACK connector. Only Megahertz delivers both.

Portable computer users on the go are welcoming PCMCIA as the new standard for compact, easy-to-install, credit-card modems. But now there's an important new breakthrough that

raises the standard. XJACK™ (extendable jack), part of the new PCMCIA data/fax modems from Megahertz.



In the PCMCIA slot, XJACK pops out for use and back in for travel.

XJACK™ is a simple and practical connector that pops out with the touch of a finger and allows you to hook directly to a phone jack without bulky cables.

XJACK, built to last.

XJACK™ is not only convenient, it's rugged and dependable. Independent

Buy The One That Sets The Standard.



tests have proved XJACK™ to be more durable than the other PCMCIA modem connectors on the market.

Of course, the retractable XJACK™ is just one feature of our industry leading modems. You can choose from our 14,400/14,400bps, 9600/9600bps or 2400/9600bps data/fax modems, each

with 4-to-1 data compression, error correction, a 5-year warranty and toll-free technical assistance from our Support Center. These modems are Hayes compatible, they fit effortlessly into any PCMCIA 2.0 slot and they're engineered to be interchangeable with virtually all brands of portable computers.

For a Fax on Megahertz modems, call 1-800-LAPTOPS ext. 6920.

If you're buying PCMCIA modems as standard equipment, call us today. Because the company that set the standard for convenience and portability has just raised it.

 **Megahertz™**
Linking Your Worlds

How to

Suddenly, you have more control over your time. You can schedule meetings with dozens of people at once. No more telephone tag. No more time lost chasing busy people.



Time and Place

time management solution from IBM that's

Welcome to Time and Place/2, the leading edge LAN

make

more

of your most

a powerhouse of productivity.

Time and Place/2 helps organize everything. From prioritized "to do" lists to deadline "alarms" to plans of people and their assigned tasks. It does routine scheduling, posts updates, and displays designated users' personal calendars with daily, weekly and monthly

valuable asset.

IBM
Client/Server
Workgroup
Software

views. And much more.

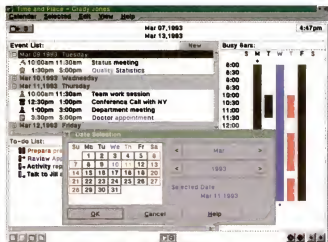
Time and Place/2 can search for a time everyone is free for a meeting—then schedule it automatically. It can even remind you as the time nears.

With its state-of-the-art graphical user interface, Time and Place/2 is easy to learn and use. Based on OS/2® 2.0, it lets you harness the 32-bit power of today's 386+

machines. So it's ideal for client/server environments. What's more, it also works with DOS workstations under Microsoft Windows.* And it lets you communicate through E-mail over other networks.

On-line help is always available. And it comes with IBM's world class service and support. Don't lose another nanosecond. Call now to order Time and Place/2 or to get free information including a demo diskette. Dial 1 800 IBM-Call, ext. S41. In Canada, to order or for more information, call 1 800 465-1234, ext. 379.

Time.



Time and Place/2, another software application from IBM Programming Systems.

Tech Talk / Steve Gibson

Avoid DOS 6.0 data loss with SmartPrompt or other TSRs



I know that I've hit a nail on the head when for 10 days half my time is spent just keeping up with all of the mail generated by a column. My column of May 17 (page 34) broke all electronic mail records. In that column, I disclosed my suspicion that MS-DOS 6.0's default installation of its SmartDrive hard disk cache with deferred writing (and without any provision for delaying the return of the DOS prompt until after the cache has been completely flushed) might be responsible for MS-DOS 6.0 data loss.

That column also presented SmartPrompt, my little 336-byte TSR that makes the DOS prompt "safe" once again. Because our eight-line BBS was swamped with downloads, many people wrote to ask where they could find SmartPrompt on-line. For the record, SmartPrompt is located on CompuServe in Data Library 1 of the IBMVM forum under the name SMARTP.COM. Internet users looking for anonymous FTP downloading can find SmartPrompt on SIMTEL-20, oak.oakland.edu, or any of their mirrors, under the name SMARTPMT.ZIP, probably in the msdos.dskut directory.

Amid the flurry of E-mail, I was amazed to learn how many people were already very aware of this problem with SmartDrive 4.0 and 4.1. Because the problem has existed since the release of Windows 3.1, which installed SmartDrive 4.0 with the same default configuration, many people had already worked around the problems inherent in a write-deferring cache that doesn't clean itself up before returning to DOS. Many people have created clever batch files that run DOS applications, then execute the command SMARTDRV/C before terminating back to the DOS prompt. This command forces SmartDrive to flush any pending writes before returning to the user. One person wrote to say that he always instructs people to enter this command before they turn the computer off. (I hope they always remember!)

Still other readers had discovered that they could force a cache clean-up by triggering a reboot with the famous Ctrl-Alt-Del keyboard sequence. SmartDrive intercepts this hotkey action and flushes its cache before allowing the system to reboot. After a reboot was underway, these people would turn their computers off in (relative) safety. I was frankly amazed to see how many people had cooked up workaround solutions for this problem.

Although a tiny TSR like SmartPrompt is a much better solution to this problem, many readers have been so abused by poorly written TSRs in the past that they will go to any lengths whatsoever to avoid loading anything permanently in their system's memory.

I understand how they feel. But writing robust resident programs is no longer akin to black magic. Today it's pure cold science. If you'll give it a chance, I'm sure you'll find that SmartPrompt behaves itself quite well.

One of the reasons more people have

not been experiencing data loss under Windows is that Windows itself completely resets the SmartDrive disk cache as it is shutting down and returning to DOS. It signals its intention to terminate by issuing an interrupt 2Fh with the processor's AX register containing a 1606h. Any interested device driver or TSR can intercept this message and plan for Win-

dows' pending exit. SmartDrive uses this message to completely reset and resize itself for non-Windows operation. In the process, all pending writes are completely flushed. If the system is turned off immediately upon exiting from Windows to DOS, no data will be lost.

In response to my statement that write caching was a beneficial technology that

is here to stay, I received a significant number of letters from people who felt that having a cache defer writes is a foolhardy and completely hazardous practice with very few benefits. Next week we will take a look inside the technology of write caching to see how it is possible to completely eliminate all the time required to write to the disk.

It can talk.

COMING JUNE 28.

Steve Gibson is the developer and publisher of SpinRite and president of Gibson Research Corp., based in Irvine, Calif. Send comments to him at MCI Mail 489-9468 or steve@grc.com on the Internet.

Announcing
LAN printers
smart enough to
connect to
your PCs, your
Macs, your
workstations, and
your future.

THE NEW IBM LASERPRINTER 4039



Five new LaserPrinters deliver 10, 12, or 16 pages per minute. And the smartest price/performance/connectivity package in the business.

There are five new LaserPrinters, with 10, 12, or 16 pages per minute, and fast RISC processors to maximize throughput. And each model gives you all this flexibility and connectivity. So you don't

have to buy a big, expensive printer to get multi-environment connectivity.

You get PostScript® and PCL5 compatibility, standard. Up to three simultaneously active ports. And built-in intelligence called SmartSwitch, to choose the right language and right port for each job, automatically.

600 dpi is standard. So is PictureGrade™ processing, for sharper images. Upgradable code

lets you add new capabilities. And there's a host of

paper-handling options, including a snap-on duplexer, for the lowest-priced two-sided desktop printing in the business.

The new LaserPrinters are the latest from Lexmark, an independent, worldwide company formed from a division of IBM with a very simple business plan. Listen to what customers

want. Bring it to market fast. Back it with quality, support, and responsiveness.

For your nearest dealer, call 1 800 358-5835 (in Canada, 1 800 663-7662).

And see LAN printers intelligent enough to put you on the cutting edge today. And keep you there tomorrow.



Two-sided printing is an option on every model, to save paper and filing space. And help save the environment.

It's one thing to build intelligent printers. It's another to build intelligent investments. The new IBM® LaserPrinter 4039 family by Lexmark is both.

For starters, a single internal network card connects the new IBM LaserPrinters to multiple network operating systems, *simultaneously*. And the card's flash memory lets you download new operating systems or update current ones, without touching the printer. So your printer stays compatible. And your investment stays intact.

Lexmark's Ethernet and Token-Ring cards give you bi-directional communications, too—so LAN

managers can troubleshoot their printers without

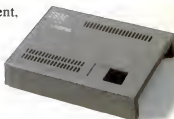
leaving their desks.

Add a Lexmark AppleTalk card and IBM 4033 external LAN

adapter (Token-Ring or Ethernet) and you can configure any LaserPrinter for just about any mix of environments—or reconfigure just as easily. (Either way, Lexmark's network-savvy Quick Start installer makes setup a fast, one-step process.)



Select a single network card, and you're connected to all these operating systems *simultaneously*.



The optional IBM 4033 LAN adapter eliminates a dedicated print server, and expands your connectivity.

IBM Personal Printers by

LEXMARK.

Make Your Mark

Novell makes no warranties with respect to these products. IBM is a registered trademark of International Business Machines Corporation in the U.S. and other countries and is used under license. AIX and OS/2 are registered trademarks of International Business Machines Corporation. PostScript is a registered trademark of Adobe Systems Incorporated. AppleTalk is a registered trademark of Apple Computer, Inc. Novell and NetWare are registered trademarks of Novell Inc. Microsoft is a registered trademark of Microsoft Corporation. Lexmark and PictureGrade are trademarks of Lexmark International, Inc. ©1993 Lexmark International, Inc.

FAMILY, BY LEXMARK. PRINT SMART.

NEWS / NETWORKING

PIPELINE

ANNOUNCED

Backup software

unbundled for Mac
Dantz Development Corp. will ship in June a stand-alone version of its Retrostep A/UX backup software for the Macintosh, previously only available bundled with Apple Computer Inc.'s Workgroup Server 95. It requires Version 3.0.1 of Apple's A/UX, also scheduled to ship in June. Upgrades from Retrostep 2.0 are priced at \$200. (800) 225-4880, Ext. 30.

Shiva Corp. announced Token Ring versions of its remote network communications servers, which come in four- and eight-port units. LanRouter/T for NetWare provides as many as 100 dial-in lines supporting speeds of up to 64Kb per second and connecting directly to 4Mb- and 16Mb-per-second Token Ring networks. Shipping in June, the product is priced starting at \$2,799. (800) 458-3550.

SHIPPING

Sassafras enhances metering software

The enhanced 3.1 version of Sassafras Software Inc.'s Macintosh-based KeyServer license metering software, which now features an automatic backup service, adds support for remote users, TCP/IP over MacTCP, and new reporting modules. Pricing per client ranges between \$35 and \$70. (603) 643-3351.

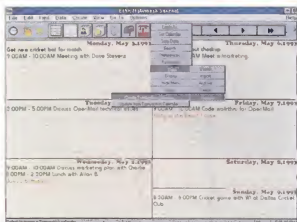
Technology Works Inc. is shipping GracelAN Server Manager, an AppleShare server management, administration, and network monitoring system. It is priced at \$395, \$695, and \$995 for one-, five-, and 10-server packages, respectively. (800) 688-7466.

Novell Inc. is shipping its MacIPX Software Development Kit (SDK) for writing cross-platform Macintosh applications using NetWare's native IPX/SPX transport protocols instead of TCP/IP or AppleTalk. The SDK is priced at \$295. (800) 638-9273.

PRICE CUTS

NetWork cuts pricing on its 10Base-T NICs

NetWork Inc. has reduced pricing on its 16-bit 10Base-T network interface cards. A single card is now available for \$189. Users who purchase a five-pack bundle get an additional savings of \$20 per card. (800) 544-5255.



Raindrop's Epoch links and embeds documents and files directly into a group calendar.

Calendar employs OLE

To-do links enable workgroups

BY VANCE MCCARTHY

A Texas start-up is completing work on a calendaring package that will be among the first programs to deliver workgroup features to Microsoft Corp.'s Object Linking and Embedding (OLE) technology.

Raindrop Software Corp.'s Epoch 1.0 calendaring software uses OLE to allow users to link to-do items—including word processing documents, spreadsheets, and other computer-based files—to their calendars. Epoch's support of Microsoft's Windows for Workgroups, Novell Inc.'s NetWare, and Artisoft Inc.'s LANtastic enables the user to authorize other network users to work on these files.

For updates, links through NetBIOS and IPX notify the original document that things have changed. Epoch also polls applications in progress, checking files every few minutes for updates.

To-do items are linked to the calendar through Epoch's WorkSlate, a type of clipboard

where users can place OLE icons that represent documents or files.

"With WorkSlate, I can have all my documents on the calendar on the day I need them," said John Jeffus, president of Epoch. "Once I've created the WorkSlate the first time, I don't have to go into any other programs."

A WorkLinks button gives the user the ability to work with others, as long as they have access to the data or application.

"Everybody has to have access to the hard disk the data is stored on," Jeffus said. "You need either a dedicated server or a hard disk that can be accessed by more than yourself."

Epoch has been designed to handle even large, complex projects. WorkSlate was tested through more than 250 objects.

Epoch will be available this summer priced at \$129 for one user, a five-user pack is \$535; 10 users cost \$895; 100 users are \$4,900.

Raindrop, in Richardson, Texas, can be reached at (214) 234-2611.

VisiNet lets NMS monitor more than just Novell NetWare

BY TORSTEN BUSSE

Starting this fall, users of Novell Inc.'s NetWare Management System (NMS) will be able to monitor NetWare 2.x servers and non-NetWare operating systems using software from VisiSoft Inc.

The Windows-based version of the VisiNet network management software for NMS, slated for a third-quarter release, will enable NMS users to launch VisiNet from the NMS console

and monitor NetWare 2.x and 3.x servers, as well as other network operating systems such as Microsoft Corp.'s LAN Manager and IBM's LAN Server.

VisiNet will also support NetBIOS LANs, including Artisoft Inc.'s LANtastic, said Ken Davis, vice president of marketing for VisiSoft.

Novell's NMS monitors only NetWare and 3.x servers.

"We also allow for decentralized, distributed network management," Davis said.

Banyan Vines adopts Windows NT, more Unix

BY JAYNE WILSON

Banyan Systems Inc. joined the crowd of vendors lining up to support Windows NT by announcing at spring Comdex last week that it will integrate Microsoft's coming operating system into Vines enterprise networks.



"We will support NT desktops and NT as an application server," said Bob Martin, director of product marketing. "We are putting only the Vines communication services on the NT server. The services will allow any other desktop on the network to access the NT server."

But Banyan stopped short of promising an Enterprise Network Services (ENS) add-on module for NT servers, like the one now shipping for NetWare.

The NT client, expected this summer, will offer complete integration to the Vines network, intelligent messaging, security, and network and system management all linked together with StreetTalk III directory services.

The news comes on the heels of Banyan's promises to deliver Vines versions for major RISC/Unix platforms, the most recent being IBM's RS/6000 workstations running AIX. Vines for AIX/6000 is expected to ship early in the first quarter of 1994.

ENS will enhance the RS/6000's capability to work as a commercial server supporting large client/server enterprise networks of DOS, Windows, OS/2, Mac, and Unix clients.

Now instead of buying two Intel servers, Vines users could move up to an RS/6000 or an HP and keep everything on one box," said Jackson Shaw, president of the Association of Banyan Users International.

With 320 Vines servers online, the Federal Deposit Insur-

ance Corp. is one of Banyan's largest customers. "This [IBM] announcement is important for us because we are just beginning to break into client/server and may begin migrating some processing down from our MVS mainframe," said Richard Campbell, senior computer analyst.

Banyan is also working with Sun Microsystems Inc. to bring Vines to Sparc workstations running Solaris early in 1994.

Vines versions for SCO Unix and Hewlett-Packard Co.'s HP-UX are planned. Support for Digital Equipment Corp.'s

Vines timetable

Product: Available:

Vines for DOS Since 1983

Vines for SCO Unix August 1991

Vines for Windows for Workgroups April 1992

Vines for OS/2 October 1992

Vines NT client Summer 1993

Vines for HP-UX End of 1993

Vines for Sparc/Solaris Early 1994

Vines for AIX/6000 Early 1994

RISC platforms is also likely.

Vines' coming NT client will be available free to Vines subscription holders via Banyan's bulletin board service. Customers can obtain a subscription through resellers. The NT client will be bundled with the next versions of Vines and Vines for Unix products.

Banyan of Westboro, Mass., is at (800) 222-6926.

McData to route SNA over TCP/IP

Framing technique reduces the number of protocol conversions

BY VANCE MCCARTHY

McData Corp. is working to provide network managers with more flexible options for linking host-based Systems Network Architecture (SNA) systems to distributed LANs.

The threefold effort focuses on routing SNA over TCP/IP links.

Chief among the technologies is a hardware/software solution that would allow managers to route SNA using any mix of routers. McData also plans to support vendor-driven plans including IBM's proposed Data Link Switching (DLS) standard for routing SNA and router maker Cisco Systems Inc.'s remote source route bridging software.

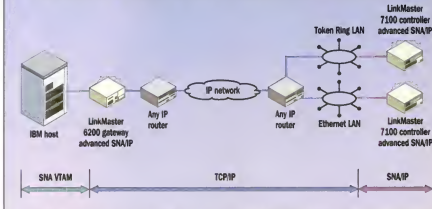
"It's much easier to consolidate the SNA and LAN network on the bridge/router backbone, because it will prove

cheaper and there is more available bandwidth for better performance," said Scott Palmquist, McData's director of product marketing. Bridge/router backbones can traditionally provide 56Kb throughput compared to the 9.6Kb provided by traditional SNA networks.

McData's Advanced SNA/IP open systems package, slated for shipment in September, is designed to reduce or eliminate the number of protocol conversions required in moving data between SNA and TCP/IP networks. A key reason is that, unlike most current solutions, the package frames SNA data before it reaches the TCP/IP network.

Advanced SNA/IP software will be available for McData's LinkMaster 7100 family of controllers, which will be able to frame SNA data within an IP

McData's 'Open Router' SNA-to-TCP/IP Scheme



McData's Advanced SNA/IP software for its LinkMaster hardware line will access TCP/IP to link users to remote hosts no matter what brand of router is in between.

header. Once the SNA/IP data leaves the controller, it can be routed anywhere in the IP network through all leading routers.

Once the data is through the network, a McData LinkMaster 6200 network gateway receives the SNA/IP frame, removes the TCP/IP information, and passes the original SNA data to the mainframe via the SNA 3172 channel interface.

The McData LinkMaster

6200 mainframe-attached gateway also removes the IP header and passes it to the mainframe.

McData also said it would support IBM's DLS specification when it is accepted as an industry standard. The proposal is IBM's first effort at making SNA specifications directly available to other vendors, which would render SNA a more open and routable network architecture. DLS is currently being considered as a

standard by the Internet Engineering Task Force.

McData also has a technology agreement with Cisco whereby its LinkMaster 6200 network gateway will offload SNA translation from the Cisco router. McData's Cisco Support Feature software is expected to ship in September for \$5,995, McData officials said.

McData, based in Broomfield, Colo., can be reached at (303) 460-9200.

Arcserve can back up multiple drives

Upgrade to Version 5.0 adds Windows interface

BY TORSTEN BUSSE

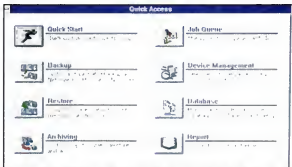
Cheyenne Software Inc. next month will ship an upgrade of its Arcserve backup and storage system for NetWare LANs that adds multiple server backup capabilities and for the first time sports a Windows interface.

Arcserve 5.0's parallel streaming functions enable it to control up to seven tape drives through one SCSI adapter. The product gives administrators the ability to perform backup operations for multiple workstations or servers on one or separate tape drives, while restoring a file stored on yet another drive, said Ray Bayer, Cheyenne director of product management.

"Since multiple backup or restore jobs can occur at the same time, the throughput of the system is doubled," Bayer said, noting that the software handles 105MB a minute.

The multiprocessing capabilities are implemented via several NetWare Loadable Modules (NLMs), which are controlled by Cheyenne's Scheduler, NLM and launch specific backup procedures at user-defined times.

A Quick Start backup option allows users to launch a full backup of the enterprise with three mouse clicks, Bayer said. Previously, a full enterprise-wide



The Windows interface of Cheyenne's Arcserve 5.0 Quick Access allows for enterprise-wide backups with three mouse clicks.

backup required users to set up several backup jobs for each individual file server and for groups of workstations.

File directories are displayed in graphical trees, which allows administrators to access backup histories.

For easier installation, Arcserve 5.0 features a Windows-based Setup program, which installs all elements of the system.

For better file tracking, the company integrated a Btrieve index record manager that allows for file searches using "and/or" types of criteria. In addition, the company developed links between Arcserve and its antivirus software Inoculan, which will perform virus scans

during backup operations. Tapes created with Arcserve 4.0 are interchangeable with Version 5.0. Cheyenne will continue to offer the DOS (4.0) version of Arcserve, Bayer said.

By August, Cheyenne hopes to have Arcserve 5.0 fully integrated with NetWare 4.0's NetWare Directory Services (NDS), allowing Arcserve 5.0 and NDS to share the same database. The current version supports NetWare 4.0 through bindery emulations.

A five-user version will cost \$395; a 250-user version is priced at \$2,395.

Cheyenne is based in Roslyn, N.Y., and can be reached at (800) 370-8991.

Proteon router offers ease of use to branch offices

BY JAYNE WILSON

For users at branch offices where cost and ease of use are key, Proteon Inc. is now shipping a bridging router that costs less than \$4,000 and can be installed in about 15 minutes.

The DNX 300n is designed for remote Ethernet LANs running Novell Inc.'s Internetwork Packet Exchange (IPX) protocol. It incorporates a 386 processor and is SNMP manageable.

The DNX 300n can support as many as 99 users on two Ethernet and offers network transfer rates of 5,500 packets per second. It also supports Open Shortest Path First (OSPF) and Point-to-Point protocols.

The product also offers a Quick Config feature that facilitates installation by prompting users through a series of questions. An automatic cable tester and LED display indicate whether the product has been set up correctly.

"To install this machine, the only thing users need to know is their LAN address," said Jay Bazzinotti, Proteon product manager. "This provides them with a low-cost branch connectivity tool."

The bridging router is often used in insurance companies, banks, and similar settings,

where it is displayed in plain view.

Users can remove the 300n card and insert it into Proteon's Series 90 slot hub or three-slot Boss hub, providing those machines with bridging and routing capability. The card also

"The only thing users need to know is their LAN address."

Jay Bazzinotti

is available separately for \$3,695.

The DNX 300n anchors the low end of Proteon's 300 series of bridging routers and is upgradable to Proteon's DNX 300i (IBM model) and DNX 300m (multiprotocol model) via an integrated boot device (IBD) for downloading software.

The DNX 300n is priced at \$3,995 for an Ethernet-to-Ethernet model and \$5,495 for a model for one Ethernet and two WANs.

Proteon is in Westboro, Mass., at (508) 898-2800.

Hub uses copper for FDDI speeds

BY JAYNE WILSON

Users with growing networks will soon get breathing room and a low-cost 100Mb-per-second throughput to the desktop with Crescendo Communications Inc.'s stackable workgroup hub.

The FDDI/CDDI Workgroup Hub will provide users with FDDI performance over cheaper copper, unshielded twisted-pair cabling. It ships in July.

The dual architecture lets customers mix and match FDDI and CDDI ports and offers 18

ports in a 2.7-inch-high case.

"Users can add our modular hubs as their networks grow and stack them via ribbon cable," said Jayshree Ullal, vice president of marketing at Crescendo.

The product's AB connections (FDDI terminology for a dual attachment) allow users to stack hubs as far apart as 100 meters with copper cable or two kilometers with fiber. Users can connect the hubs from multiple wiring closets without a bridge or repeater.

An enhanced version of the Crescendo Management soft-

ware, also due to ship in July, will let users simultaneously monitor and control multiple FDDI/CDDI Workgroup Hubs from Sun Microsystems Inc., IBM, or Hewlett-Packard Co. workstations.

Base configurations of the FDDI/CDDI Workgroup Hub start with four FDDI or eight FDDI/CDDI ports. Prices start at \$645 per port for 18-port



The Workgroup Hub provides 100Mbps speed over both copper and fiber cabling.

CDDI and \$1,144 for an 18-port FDDI unit. A Crescendo Management site license is \$895.

Crescendo, in Sunnyvale, Calif., is at (800) 236-2334.

Artisoft hubs link peer nets to Ethernet

Peer-to-peer workgroups will be capable of hooking into 10Base-T Ethernet networks with Artisoft Inc.'s new external hubs.

The T-Runner lines of concentrators will ship in two models this summer and are compatible with Artisoft's LANtastic and other networks such as Novell Inc.'s NetWare.

Both models contain a BNC connector that allows concentrators to be linked to one another with thin coaxial cable. The BNC connector works with a mix of cable types letting, for example, users on a 10Base-T segment connect and communicate with users on a coaxial segment. A partitioning feature included in the two models automatically disables ports when links are severed.

The eight-port concentrator, T-Runner 800/TC, is priced at \$449; the 12-port concentrator, T-Runner 1200/TC, is \$749.

Artisoft, located in Tucson, Ariz., can be reached at (602) 293-4000.

— Karen Rodriguez

IBM gets serious about wireless technology at conference

BY CHERYL GERBER

SAN JOSE, Calif. — IBM appears to have dominated this month's Wireless Datacomm Conference, although several other vendors also unleashed products that advance the fledgling technology.

At the show, IBM announced a deal with Business Partner Solutions Inc. BPSI's Mobile Network Access software will pro-

vide one- and two-way wireless communication between IBM's AS/400 midrange system, Motorola Corp. pagers, and DOS-based mobile computing devices from IBM, Grid Systems Corp., and Dell Computer Corp.

"The announcement shows IBM is getting serious about wireless messaging and about the AS/400 as a messaging server," said Eric Arnun, analyst and editor of the *Electronic*

Mail and Micro Systems newsletter.

Concurrently, Orion Network Solutions, an El Segundo, Calif.-based developer of networking software, announced it is developing a gateway that will enable messaging application software to support the AS/400 Mobile Network Access systems. The gateway is scheduled for release in the third quarter.

Performance Systems Inc.,

which provides two-way electronic messaging with its PSILink service over RAM Mobile Data's wireless network, introduced a combination hardware and software package called Wireless LAN-Pack.

The system lets LANs with E-mail connect with two-way wireless systems and the Internet. Available now, it is priced at \$5,250 for a five-unit pack through June 30.

NeXT AND HEWLETT DELIVER THE POWER OF OBJECTS

Financial services is an industry in which time is critically important.

Here, where every second can mean the difference between profit and loss, some companies have already harnessed the power of software objects in select departments to stay ahead of rapidly changing markets.

Now NeXT and Hewlett-Packard together offer a suite of business solutions that spread this power throughout the entire enterprise.

ANNOUNCING OBJECT-ENTERPRISE.

ObjectEnterprise combines the strengths of two technology leaders to offer what no one company can: a unified enterprise-wide information system based entirely on object-oriented software.

In a time-conscious business such as a brokerage firm, this type of system offers an irrefutable advantage. Because it allows a new generation of financial applications to be developed and deployed at every level of the organization—with radically greater speed.

ObjectEnterprise brings NEXTSTEP® software to a full spectrum of Hewlett-Packard hardware, from PCs to workstations, with full support for NEXTSTEP objects on business servers. The result is a seamless and scalable system that offers a true competitive advantage.

NEXTSTEP: "PROBABLY THE MOST RESPECTED PIECE OF SOFTWARE ON THE PLANET."

The opinion is from *Byte Magazine*. The fact is, NEXTSTEP is without rival as the only shipping object-oriented user and development environment.

Many Wall Street traders are already reaping the benefits of this technology, deploying complex custom applications in months instead of years.

That's because NEXTSTEP allows applications to be constructed in a modular fashion, using software objects as building blocks. These objects, easily re-used



Shell refines its own E-mail answers, sans X.500

BY ELIZABETH HEICHLER

Large corporations that want to better manage their enterprise-wide electronic mail systems have an urgent message for networking vendors: Hurry up!

The networking industry's inability to supply road-tested X.500 products for managing message traffic has prompted some firms to build their own. International oil giant Shell has built its own directory database for 30,000 X.400 E-mail users worldwide as a stop-gap until X.500 standards and products mature.

Although Shell's homegrown approach is holding together for now, managers admit they will soon run out of gas. The system's growing traffic and imminent plans to move E-mail from hosts to LANs make distributed management X.500 tools essential.

"I sincerely hope that X.500 won't take as long [as X.400] before we get to operational products," said Henk Reimers, con-

sultant in message handling at Shell Internationale Petroleum Maatschappij B.V. in The Hague, Netherlands.

Traffic among these 30,000 X.400 addresses is increasing, with 60,000 X.400 messages transmitted in January alone, Reimers said.

Shell's homegrown directory database is built on top of its X.400-based Shell International



Message Interchange Service (SIMS) backbone. The backbone links a variety of electronic mail, fax, and telex messaging systems, Reimers said.

SIMS connects a range of office systems with public E-mail, telex, and fax. In addition to providing connectivity and routing among different systems, SIMS supplies managers with audit-trail and charge-back information.

The newly deployed central directory for mail users, called SIDIS (SIMS Directory Information System), is built atop a relational database. SIDIS collects, distributes, and processes E-mail addresses, acting as a central repository.

SIDIS, however, does not function as an active gateway and cannot be directly interrogated by Shell's SIMS software.

This means the information contained in SIDIS is maintained by local supervisors, who daily update their E-mail gateways with changes to local user information. Once a week, the

Mail and cc:Mail," Reimers said. A central directory such as SIDIS will not be the best solution as LAN-based E-mail gains acceptance in the company, Reimers added.

The demands placed on Shell's messaging systems have been shaped by Shell's complex corporate structure.

Shell's homegrown approach is holding together, but managers admit it will soon run out of gas.

local E-mail gateways are updated with directory information from the SIDIS database. Built-in filtering mechanisms ensure that sites get only what they need from among Shell's 30,000 X.400 addresses.

Although SIDIS efficiently manages directory information from host-based mail systems, it will not suffice as Shell's E-mail traffic becomes distributed across LANs, Reimers said.

"Our biggest growth is LAN-based E-mail, such as Microsoft

At the top of the corporate structure are two parent companies, Royal Dutch Petroleum and Shell Transport and Trading Co. These firms own more than 1,000 operating companies in more than 100 countries. Downsizing from host to LAN-based messaging systems is taking place throughout this maze.

In the Netherlands, for example, Reimers currently has 6,000 to 7,000 E-mail users on a host-based system, with addresses maintained in a single directory.

Once he moves his users to LAN-based E-mail, the system will be broken up into a collection of 20 or so post offices.

"Maintaining a central directory with the hundreds of LAN servers in a LAN-based E-mail system would be impossible," Reimers said. "We want directory management to be distributed rather than centralized. That's why we must move to X.500."

Yet many products based on the 1992 X.500 specification are not available or are unproven. Those few time-tested products that are available lack key capabilities such as access-management functions, Reimers said.

It is Shell's early experience with X.400 that is causing Reimers and other managers to wait for acid-tested X.500 products. "When X.400 came along, Shell was among the first to jump in," Reimers said. "With X.500, Shell does not want to repeat the experience of being on the 'bleeding edge,' working with products based on an immature standard." □

—Elizabeth Heichler is a European correspondent for IDG News Service.

PACKARD NOW ON AN ENTERPRISE-WIDE SCALE.



and maintained, take the place of complicated and error-prone computer code.

While the rest of the computer industry is still years away from implementing an object-oriented system, NEXSTEP is here today. Polished and perfected in its third release.

AN OBJECTIVE POINT OF VIEW FROM DESKTOP TO DATA CENTER.

Hewlett-Packard has long led the drive toward interoperability and object computing, offering a scalable hardware architecture from the client desktop to the enterprise-wide data center.

With a family of products including Intel® 486-based Vectra PCs, PA-RISC workstations and business servers, Hewlett-Packard delivers leading technology at all levels. Along with quality engineering and rock-solid service and support.

By joining in Object-Enterprise with NeXT, Hewlett-Packard is redefining the level of performance you can expect from an advanced trading system. And its industry-standard hardware provides the assurance that Object-Enterprise will integrate seamlessly with your existing investments.

SEE HEWLETT-PACKARD AND NeXT. NOW IN CONCERT.

Object-Enterprise gives you one point of contact to tap the collective power of Hewlett-Packard and NeXT. And we do encourage you to make contact.

Call us at 1-800-TRY-NeXT for more information, and to reserve seats at one of the Object-Enterprise Seminars scheduled in New York, Chicago and San Francisco throughout the summer.

We think it will be a day well spent. And we're keenly aware of how valuable your time can be.



Wildcat BBS includes graphics

Mustang Software Inc. has delivered a graphical interface to the 5 million users who log on to BBSes every month.

Version 3.9 of the Wildcat Bulletin Board System (BBS) and Version 3.1 of Qmodem Pro communications software add support for the Remote Imaging Protocol (RIP) graphical interface, an emerging standard for BBSes.

Mustang's RIP-equipped software can send full-screen graphics and lets mouse users select BBS commands by clicking on-

screen prompts. To access Wildcat's RIP graphics, the incoming call must come in over Qmodem or other RIP-equipped communication software.

The release includes a fax-sending module, allowing Wildcat to make text and graphics PCX files available to callers via fax.

Both products are available now. Wildcat 3.9 costs \$129; Qmodem 1.3 costs \$99.

Mustang, in Bakersfield, Calif., is at (805) 395-0223.

—Cheryl Gerber



Point-and-click log-ons come to BBS users with Wildcat's latest release.

Routers cut telecom costs

Microcom to offer self-adjusting WAN software

BY TORSTEN BUSSE

Microcom Inc. will ship next month self-adjusting software for its bridges and routers to help managers cut wide area network telecommunications costs.

Microcom's MBR 7.0 remote bridging and routing software, which works with the company's Bridge/Router models MBR/6000 and MBR/6500, routes TCP/IP and IPX traffic over Token Ring or Ethernet.

When used for routing network traffic to and from remote sites over leased telecommunications lines, the software increases routing capacity by dialing circuit switched lines when data traffic hits peak levels.

"[MBR] watches the leased line, and when it hits a certain level of congestion or capacity, it will dial up switched-56Kb-per-second lines or dial up a modem scanning the data over these additional links," said John Hann, Microcom marketing manager for internetworking products.

When the excess capacity is no longer needed, the circuits are automatically disconnected, Hann said.

Thresholds for triggering the bandwidth adjustments are all user configurable.

For Novell Inc.'s NetWare traffic, the software offers the IPX Autodial feature, which connects remote LANs over ISDN, v.32bis modems, or switched-56 lines only when data transfer occurs. This eliminates the need for a permanent leased line. Remote sites typically use leased lines only 1 to 2 hours a day, Hann said. Microcom intends to offer the autodial feature for TCP/IP traffic in a later version of MBR.

If a leased line fails, the software can automatically redirect data traffic over a circuit-switched network.

The MBR/6000 and MBR/6500 support SNMP and can be managed out of band via the company's Carbon Copy remote communications software, or with Hewlett-Packard Co.'s OpenView Network Node

Manager. Both let users configure parameters and thresholds.

MBR/6000 and MBR/6500 starter kits — including WAN and LAN interface cards, the MBR 7.0 software and RS-232C/V.35 cables — are priced starting at \$4,299 for a two-port Ethernet version and \$4,799 for a Token Ring version.

Stand-alone plug-and-play bridge/routers built around a PCAT are available starting at \$5,199 for the two-port Ethernet version and \$5,699 for the two-port Token Ring version.

Microcom also intends to develop by late this year a version of its LANtord desktop management systems, which will run on IBM's LANtordView management platform. LANtord NV will support IBM's Presentation Manager interface and will communicate with OS/2, DOS, and Windows agents. The product will provide desktop inventory, monitoring, and software metering capabilities.

Microcom is headquartered in Norwood, Mass., and can be reached at (800) 822-8224.



Savings on NEXTSTEP Developer Library

Get a special discount on the complete set of NEXTSTEP reference books from Addison/Wesley covering every vital NEXTSTEP topic, from interface guidelines and development tools to object-oriented programming in Objective C.



Garfinkle & Mahoney
"NEXTSTEP
Programming Book"

It's the first comprehensive guide to the rich, graphical world of NEXTSTEP — providing an in-depth look at the remarkable benefits of object-oriented programming. In the book stores, it would cost a good \$39.95. But it's yours free with the purchase of the NEXTSTEP Evaluation Kit.

NEXTSTEP Advantage Kit

You get a detailed booklet and video cassette that take you, step by step,

step, through the process of building a custom application in NEXTSTEP. You even get a floppy disk containing the source code.



NEXTSTEP Developer

Complete and unabridged, you get all the developer's tools for NEXTSTEP. That includes Interface Builder and the full library of objects and bits (Application Kit, Database Kit, color picker, print/fax objects and more), as well as exhaustive online documentation.

Copyright 1993 Apple Computer, Inc.

LAN Talk / Paul Merenbloom

Configuring SCSI devices doesn't have to be a headache



If you want to add CD-ROMs to your network, there's a lot to learn. CDs (at least most of them) are built using SCSI interfaces. And, if you've ever had the experience of installing Vendor A's SCSI controller with Vendor B's disk drive and Vendor C's software, you may know why it's called *scuzzy*.

For a good introduction to the subject, read Brian Livingston's May 10 "Window Manager" column (page 26).

Today, tens of thousands of LANs use SCSI technology for disk and/or backup tape services, but Small Computer System Interface has its share of problems.

Addressing a void in the SCSI "standards" niche, Adaptec Inc. offered its SCSI Programming Interface (ASPI) as a public-domain definition. Soon after that, many hardware and software vendors adopted this specification and off-the-shelf interoperability of SCSI devices became a reality.

Even still, configuring SCSI devices can be a challenge.

The hassle begins with setting I/O, memory address, and BIOS enabling/disabling jumpers. Next, assuming you don't have any hardware conflicts, you get to install the drivers (and their multiple parameter switches) to enable the operating system to properly recognize the devices.

Finally, assuming all this has gone well, it's time to get the software to "talk" to the devices on the SCSI card. Fun, huh?

I agree that you should stay away from cards that Brian labeled "bastard SCSI," or proprietary SCSI cards developed by individual vendors. Stick to products from companies such as Adaptec Inc., BusTek Corp., and Future Domain Corp. They're proven and state of the art.

If you are buying the SCSI card and related equipment now, take a serious look

at fool with pins and jumpers.

Using ASPI calls, hardware-independent programs such as ARCserve can automatically detect tape backup drive addresses, capacity, format, and more. Some Windows programs even auto-detect scanners to use with graphics applications and write-once, read-many or magneto-optical storage devices. But first you have to properly install the ASPI support software.

After fighting many battles with

Windows files. Best of all, it worked on the first pass.

Corel SCSI offered many of these same services and supports most every SCSI device known, but, in my opinion, the set-up using EZ-SCSI was a bit easier.

Once you have the hardware and drivers worked out, there are a few rules of SCSI to keep in mind: A maximum of seven devices is "attachable" to each controller card; each device must have a unique address; each device must be recognized by the operating system; and SCSI cabling and termination must be done correctly or it just won't work.

There is also a quirk I should let you know about. It seems that some SCSI devices are "self-terminating." In several instances, I have installed SCSI cards in devices exactly as directed by the manufacturers' instructions only to find that the devices did not work. The problem turned out to be "overtermination." By removing the SCSI terminator cap from the last device on the chain, everything worked fine.

Next week we'll look at the CD-ROM sharing software.

Paul Merenbloom is manager of information technology at Otsuka America Pharmaceuticals, in Rockville, Md. Send comments to him via CompuServe at 70743,3524 or via MCI Mail at Paul Merenbloom.

EZ-SCSI configured everything — CD-ROM, hard disk, tape backup — in just 10 minutes.

No kidding.

at 32-bit EISA cards, Micro Channel Architecture (MCA) cards, or SCSI interface cards such as the new Adaptec 1542-C cards. These cards are fully configurable via software — no more jumpers to set. Using either the MCA or EISA configuration programs, these cards can be configured and conflicts arbitrated in a matter of minutes.

The Adaptec 1542-C, although it lacks the auto-configuration offered by MCA and EISA, allows you to manage its settings via software instead of having to

jumpers, CONFIG.SYS entries, and device driver parameters. I discovered EZ-SCSI from Adaptec and Corel SCSI from Corel Systems Corp.

EZ-SCSI is a LAN administrator's dream. EZ-SCSI configured everything — CD-ROM, hard disk, tape backup — in just 10 minutes. No kidding.

The program correctly identified the SCSI card I was adding, the one I was using (for a disk drive), and the devices attached to each, and it made all of the necessary entries to my CONFIG.SYS and

© 1988-1993 Next Computer, Inc.
All Rights Reserved. Certain portions
of the software are copyrighted by
third parties.

THERE'S NO QUESTION ABOUT OBJECT-ORIENTED NEXTSTEP THAT \$299 WON'T ANSWER.

If you're a developer of mission-critical custom applications, you've already heard the talk about object-oriented software. It's time you experienced the real thing: NEXTSTEP® for Intel 486 and Pentium® processors is here.

For a limited time, you can get the whole system — developer and user versions — for only \$299.* (Quite a deal, considering these versions alone retail at \$795 and \$1995 respectively.) And this isn't some watered-down

version of NEXTSTEP. It's the real thing. Fully functional. Including all

the tools you need to develop and run your custom applications on industry-standard hardware. This offer even includes all of the informative and money-saving extras you see to the left.

To order your own NEXTSTEP Evaluation Kit, just call 1-800-TRY-NeXT. You'll find out why so many people are calling it the most advanced software in the world. No question.

**OFFER EXPIRES
JULY 31, 1993**

1-800-TRY-NeXT

Yes, the deadline is real. But so is our offer. Order our Evaluation Kit for only \$299, and we'll send you the complete, fully functional, object-oriented NEXTSTEP for Intel processors. This offer includes both the user and developer versions, full NEXTSTEP development tools and all extras described in this ad.



NEXTSTEP Release 3.1

With the full user environment, you'll see how NEXTSTEP applications use objects to work together, and call on system services such as e-mail and faxing. It's a seamless world in which custom-developed NEXTSTEP applications integrate perfectly with off-the-shelf products (as well as MS-DOS and Windows applications).



THE OBJECT IS THE ADVANTAGE.®

©1993 Next Computer, Inc. All rights reserved. NEXT, NEXTSTEP, the NEXT logo and The Object Is the Advantage are trademarks of Next Computer, Inc. Intel is a registered trademark of Intel Corporation. All other trademarks mentioned herein are their respective owners. *Special offer does not include developer documentation or fee upgrade to 32-BIT NEXTSTEP Release 3.2

TO THE EDITOR

Once burned

As a "heavy user" of MS-DOS, I was delighted to purchase Version 6.0, which I thought would have the same easy installation as DOS 5.0, and to install the new operating system, and no problems appeared in the first two weeks.

Then, one day, in the middle of an application (FoxPro), the system crashed. Needless to say, the hard disk (a brand new ST3283A) turned out to be in perfect shape.

Reading your articles about DOS 6.0, I was able to identify the same type of problem as the ones reported as "mysteries."

In my opinion, there is nothing mysterious. It is clear that Microsoft rushed the product on the market without enough testing and without caring about the end-users.

I was the 38th person on hold on the DOS 6.0 tech support line; the wait was estimated to be 2 hours. The price of the phone call would eventually equal the purchase price of 6.0. I gave up, reinstalled 5.0, and am looking forward to IBM's new DOS.

Microsoft should publicly apologize for the inconveniences and eventually set up an 800 number. Thank you, *InfoWorld*, for the professional way you have helped PC users.

Valentine Mayer
Wanaque, N.J.

Twice shy

Atta-boys-and-girls to Stewart Alsop, and Kevin Strehlo, and the entire Test crew for their fearless coverage of the problems with MS-DOS 6.0. As the owner of a computer training company that specializes in accounting applications, I view product upgrades with mixed emotions: excitement and fear. Backup mania prevails. You must have two verified tape backups before we begin.

I can just imagine telling a client a month later when data corruption occurs: "Oh, by the way, we'll have to restore to your pre-upgrade backup and you'll have to re-enter a month's worth of work." Get real.

You don't have to be a rocket scientist to realize that many editors are weenies who don't dare offend major advertisers with bad product reviews. Thank goodness that Stewart Alsop is not one of them. As for Mr. Gates, maybe he should read Tom Wolfe's *The Bonfire of the Vanities* to see what happens to Masters of the Universe.

Elizabeth Way
President
Abaca Computer Solutions Inc.
Boynton Beach, Fla.

Key to success: backup

Our institution is a single anecdotal data point, but I've been quite pleased in the enhancements that MS-DOS 6.0 has delivered. The operating system offers a single vendor focus of support, eliminating the vendor-to-vendor finger-pointing we've experienced all too often.

To date, we've had no suspicious

problems with DOS 6.0. Our formula for success has been to use a portable tape machine to do a complete file-oriented backup prior to the DOS 6.0 upgrade, reformat the drive, enable DoubleSpace compression, then restore the user's files.

We've found that the backup-format-restore operation saves time over trying to retroactively compress a drive that may already be riddled with fragmentation, damaged files, and lost clusters.

Finally, we've found that caching hard disk writes adds very little performance benefit to the ways in which most of our users work. We disable write caching by specifying SMARTDRV H. This presumes that the actual physical hard disk is mapped to H, with DoubleSpace serving C. This avoids problems due to users shutting their machines off before the write cache has drained. No mysterious success is required to assure data integrity.

Bill Mayhew
Computer Services Electrical Engineer
Northeastern Ohio Universities
College of Medicine
Rootstown, Ohio

DOS prayers

Kevin Strehlo's lament is one of the best pieces to appear in your pages. (See Second Look, April 26, page 1.) Although MS-DOS is not dead, it is killing off big chunks of our lives by demanding that we accommodate its quirks and limitations.

We acquire mysterious and secret knowledge of how to placate DOS. We practice DOS rituals. Less experienced DOS users are impressed. But those who work with better operating systems wonder what all the fuss is about and why we sacrifice ourselves to the great DOS.

Even Microsoft (through Windows) is trying to let us know that enough is enough. Moving on may not look easy, but standing pat is increasingly untenable.

Jordan Rosenberg
San Francisco

Born yesterday?

Write-behind caches didn't fall out of the sky yesterday. They have been in widespread use at least since the release of Microbehind SmartDrive utility with Windows 3.1.

Continued pounding on write-behind won't compensate for what was obviously some fairly sloppy test work on your part. If you had run the tests on a control system without compression, the odds are good that the write-behind would not have caught up by reboot either.

The other thing that didn't fall out of the sky yesterday was the DOS 6.0-compatible upgrade of SpinRite that I (and presumably a lot of others) paid for and was promised by Gibson Research Corp. Better tools for working with DoubleSpace-compressed disks would be far more welcome than continued backpedaling on DoubleSpace.

Will King
Los Angeles

Figures don't lie

Hats off to Cheryl Currid for her article regarding system cost analysis. (See May 10, page 79.) As a trainer, I am often asked for advice on what kind of computer people should buy. My immediate response is, "What will you do with it?"

I tell my students, clients, and anyone else who will stand still long enough that if a salesperson doesn't ask you why you want a computer (or what you will use it for), run don't walk the other way. Any salesperson or consultant who doesn't take the time to understand the organization's total information needs is worse than nothing at all because he or she will cost the organization money—both in terms of the equipment and in terms of lost productivity.

Keep sounding the warning, Cheryl. We all need the reminder once in a while.

G. Joseph Kabaneck
Assistant Training Specialist
Texas Engineering Extension Service
Texas A&M University
San Antonio

Working with vendors

I've been following the gripe line discussion and have a constructive suggestion for the vendors on the user side. When you have problems with software that is important to your work, consider an attempt to become a beta tester for that software. This gives you many advantages:

1. You get an early view of changes to the software before the next version that might adversely impact you.
2. You get an early chance to help weed out any bugs that might adversely impact you.
3. You get a chance to offer some suggestions and get feedback on them at this point in the development cycle.
4. You get a jump on new features in the next version.
5. You will gain a much greater appreciation for how difficult a task making software is from the vendor's side of things.

Beta testing does require a real effort. It is very demanding work. If the idea of becoming a beta tester does appeal to you, pick a software product that you use passionately—software that you can't live without.

Of course, you are not too likely to become a beta tester by being rude or threatening to the vendor. Try to work with them. You never know—you just might be building a safety net that can catch you in the event that your current job disappears.

Al Danks
Sr. Systems Analyst
General Motors Powertrain Group
Ypsilanti, Mich.

Please write to Letters to the Editor, *InfoWorld*, 155 Bovey Road, Suite 800, San Mateo, CA 94402; (MC) Mail: 259-4227; *Compuserve*: 73267-1537; *Internet*: letters@compuserve.com. Letters may also be faxed to *InfoWorld* at (415) 358-1269. Please include your name, address, and daytime telephone number. Letters selected for publication will be edited for length and clarity.

INFO WORLD

Editor-in-Chief
Editorial Director
Editor
Assistant to the Editor-in-Chief

Stewart Alsop
Michael Lowe
Greg Gertner
Krisn Kuster

NEWS & VIEWS

Executive Editor Robert Jones
News Editor Katy Gurley
Opinion Editor Rachel Panner
Editor at Large Scott Mace (Washington)
Associate News Editor Caroline Carr
Editorial Assistant Doug Barney (Boston), Greg Gertner
Staff Writers Jim Hammond (Software), Vance McCarthy (Networking), Tom Quinlan (Hardware), Mark Stephens
News Chiefs Stuart Johnson (Boston), Steve Poole (Dallas), Ed Scannell (Boston)
Assistant News Editor Karen Rodriguez
Senior Writers Jeannette Bova, Terrell Bussie, Gabe Corcoran, Kelley Darnore, Wynne Lee, Shawn Willet (Business), Wayne Wilson (Boston)
Research Editor Harriet David
Editorial Assistant Lisa Oranga
Administrative Assistant Shirley French
Field Editor Robert J. Conigley
Contributing Editors Cheryl Cantor, Steve Goss, Brian Liebowitz, Paul Merrellbaum, David Strom

ENTERPRISE COMPUTING

Executive Editor Nancy Scott
Senior Editor Doug Smith
Contributing Editor Alice LaPorte

REVIEWS & TESTING

Executive Editor Keith Stephens
Reviews & Testing Manager Don Sommer
Reviews Editor Carla Matthews
Test Center Administrator Steve Ivin
Testers Elizabeth Cole, Senior Editor (NY), Leslie Anne Kalkas, Associate Editor (Networking, Multimedia), Andre Kurika, Analyst (Spreadsheets, Communications), Nicholas Petrillo, Senior Editor (Enterprise), John Soraganes, Associate Editor (Databases, Application Development), Dave Walker, Test Developer (Hardware, Systems), Jim Welch, Analyst (Test and Graphics)
Senior Test Developer Jim Welch
Test Developers Peter Chu, Tim Crawford, Victor Garza, Jeff Senia
Associate Editors Ann Macos (Spreadsheets, Communications), Sophia Nash (Hardware, Systems, Test Drives), Karen Brophy (Reviews)
Senior Systems Analyst Mark Glasser (Test and Graphics)
Systems Analyst Nancy Chatterjee
Technical Analysts Earl Ariga, Rod Chapin, Ken Gura, Patrick Lyons, Jeff Symons, David Van Horn, Andrew Ullrich, Tim Zittel
Network Administrator Rodney Galie
Inventory Controller Andrew Mattias
Administrative Assistant Lynne Sander
Contributing Editors Denise Green, Doug Green, John Lombardi, Patrick Marshall, John Wallenbach

EDITORIAL PRODUCTION

Managing Editor Bob Karpine
Art Director Ben Barabara
Associate Managing Editor Tricia Harner
Associate Art Director Sarah Bralich
Chief Copy Editor Rocky French
Illustrator Greg Boren
Copy Editors Bob Gabe, Marlene Goldstein, William Krinsky, David Van Horn, Lucy James
Layout Designer Sandra Alexander
Post-Production Editor Sandra Alexander

EDITORIAL EVENTS

Director Lin Lomax
Conference Administrator Blanche McIndoe
Event Producer Theresa Solofino

CORPORATE ADVISORY BOARD

Sally Atkins, JCI; Chapman (Albany), Michael Henry (APOLIS), Bob Holmes (Southern California Gas), Forrest Jones, (Cognitive-Palmolive), Phyllis Kohn (Ryder Truck), Ken Kohnert (Sprint), Shoshon Laska (Price Waterhouse), Jim Lusk (Federal Express), Keith Smith (IBM), Robert Kimpert, David Tompkins (Southern California Edison), Douglas E. Welch



From the Editor / Ed Foster

Keeping big iron is fine — if your business never changes

Long ago, when I was a young journalist, I spent a few years in Japan. Near where I lived there was a small but bustling pan-ya — a bread shop — where I often bought various staples such as sake and beer.

One night coming home from work I found the elderly lady who ran the place sporting a new cash register in place of her old abacus. Her husband, whom I never saw, had bought it for her so she could serve customers faster, she told me somewhat dubiously. She was having a little trouble learning it, but progress sometimes does require us to take a step back before we go forward.

A few days later, I saw that the cash register had disappeared and the pan-ya proprietress had returned to using her trusty abacus. The cash register, she complained, was completely *dame* — no good. She was faster with the abacus, she would always be faster with the abacus, and that was that.

I am reminded of this scene by some of the recent articles about how hard downsizing is. *A Wall Street Journal* article a few weeks ago noted: "Indeed, boardroom disillusionment about the pace of downsizing has prompted some analysts to think what last year would have been unthinkable: that demand for mainframe computers could surge as companies realize that the downhill shuffle isn't all it was cracked up to be."

No one's saying that client/server computing isn't still the wave of the future, but there seems to be a feeling that maybe the mainframe has a more



significant role in the future than we thought. Like the pan-ya lady and her abacus, some IS departments may decide that the mainframe is always going to be the best tool for their mission-critical applications. They've done it on mainframes before, they'll do it on mainframes in the future, and that's that.

That would be a big mistake.

The woman at the pan-ya was certainly right that the abacus was the best tool for the work she did. A skilled abacus user can do simple transactions as fast as you can with any calculator. She could handle her stream of customers just fine with the tool she knew so well.

I haven't been back to that neighborhood in years, and she would be long retired in any case, but I wonder if that pan-ya is still there. Some of the smaller neighborhood shops in Japan are disappearing as supermarkets and discount stores become more popular. If she were still working, she might find her store losing business to the high-volume operations where cash registers are a necessity.

The tool you've learned to use for the job you've always done is going to be hard to replace. If you are to remain competitive in the marketplace, however, there will come a time when you have to change the way you work. If you don't, you will find you have a tool that's really good at doing something no one needs.

It's easy to see why an old-line IS department might want to continue focusing its development

efforts on the mainframe platform it knows best. But if mainframes were the answer, PCs would never have started showing up in the corporate world in the first place. It was because IS departments were so backlogged and unable to respond to the growing information needs of their organizations that business users found PCs so useful.

Certainly downsizing is no piece of cake, but neither is writing new mainframe application. The products that make it possible to move mission-critical applications to networked PCs are still just emerging, and there are lots of missing pieces and things that don't quite work right. The same, however, can be said of the mainframe environment, in spite of its much greater maturity. What can't be said of the big iron is that we can expect it to get much better. As object-oriented and GUI environments for the PC environment mature, however, we can be certain the downsizing task will become much easier, particularly for those who are starting to learn how to do it now.

Certainly it's true that most corporations have too much time, money, and data invested in their big systems to just toss them all out tomorrow. That shouldn't lead anyone to think, however, that mainframes are a viable alternative to PCs for the future. They will only be the best tools for the job if they're the only ones you know how to use.

Ed Foster is editor of InfoWorld. He gets electronic mail at MCI account 554-3453. Or, you can call (800) 227-8365, Ext. 710, to report a gripe you have with a vendor.

Peer to Peer / Kent Summers

Adobe's Acrobat document interchange solution is too little, too late

Kent Summers is an independent consultant specializing in document automation technology planning.

Not too long ago, Adobe Systems Inc. stuck an important stake in the ground around which consumers could measure a critical software need: printing. If an application provided the necessary features, and if it was PostScript-compatible, chances were you weren't wasting your money. So, I've always kept my eye on Adobe to see how it would evolve PostScript. Would I someday be able to edit a PostScript file produced in another application and pass it on? Would I be able to search through a PostScript document on-line for key words or phrases? Would Adobe ever provide a solution for streamlining on-line document-based communication?

I recently visited the Spring '93 Seybold Electronic Publishing Conference in Boston and sat in on Adobe's presentation, mostly to see what all the hoopla about Acrobat was all about, would I like to offer my observations.

Carousell seems to have disappeared; Acrobat is now its official name. I heard something awfully back as a Kodak trademark infringement. Or maybe the name was changed because Carousell took far too long to deliver and analysts were having a field day with the name.

Regardless, Adobe is blowing smoke. Anyway, I didn't see any actual software in the half-hour Acrobat presentation. So I turned to the printed materials for some information.

Acrobat is designed to provide a document interchange solution for those of us who own different types of computers and applications, produce a lot of printed material, and would like to share the information within and outside our organizations. But this technology is too little, too late. And this is frustrating.

Acrobat displays a page on the computer screen that has been formatted for a printer, without the capability to search for words or phrases. Nothing new here. The "page flipper" paradigm has been around for a long time, and common wisdom has it that it's just not suitable for on-line document delivery. One document view assumes that the same document's composition and structure is effective (even acceptable) for both printed and on-line output. This is OK if you are in spending half of your time scrolling, panning, and zooming instead of reading. Make no mistake — you will need to read at least as much as you did before, because you cannot search for things.

Adobe's Portable Document Format knows document composition (fonts, layout, etc.), but it has no knowledge of

a document's components, its structure, or the content of the information. Acrobat should therefore add some "convenience value" to high-end office communications, such as high-resolution printing of fax and E-mail. But it will never be capable of handling the meat and potatoes information needs of a company. Acrobat will never serve information from a central information

Acrobat seems to have no underlying customization tools.

repository to supply document components based on nomenclature, structure, or semantics to different parts of an organization that will serve different audiences. This is clearly where enterprise-wide publishing technology is headed; Acrobat completely misses the boat.

Adobe says the product is designed for information consumers. But outside of the standard user-level Windows tricks, there doesn't seem to be any underlying customization capability or tools for independent software vendors to develop custom document viewer interfaces

to meet specific platform or application style requirements, different types of information, or a specific audience. Assuming that a single viewer interface is appropriate for every type of document is risky at best.

Reading the literature carefully, I concluded that some pieces of Acrobat are less ready to release than others; components are described in the future tense. Ultimately, however, Acrobat's success in the document automation market hinges on several things: tapping uneducated consumers swayed by glitter, not substance; persuading people to feel comfortable locking their real assets (information) into Adobe's proprietary format; appealing to those users who have not gone with an SGML-based document management approach; and releasing the product in three months — before Adobe has to renege it again. One thing is for sure: Unless people wake up and smell the coffee, Adobe will surely accomplish what it has been so successful at in the past — holding up people's purchasing decisions.

"Peer to Peer" gives readers a forum for discussing computing and management issues. Send submissions to Rachel Parker, opinions editor (MCI Mail 340-4371). Submissions can also be faxed to (415) 358-1269.

Easy to manage. Our new AppleShare Pro software delivers graphical tools to greatly simplify your server management tasks. So you can spend less time responding to workgroup requests, and more time being productive.

Lower cost of ownership. When server management is easier, it's also less expensive. The ease of use of AppleShare Pro translates into dramatic cost savings over time — in both single-server and multiple-server environments.*

Workgroup strength. The Workgroup Server 95 is a new machine, optimized for workgroups. It's based on the Macintosh Quadra 950, with performance boosted by a processor-direct card with memory acceleration and up to a 512KB cache.

High performance made affordable. AppleShare Pro software exploits the hardware acceleration and high-performance A/UX of the Workgroup Server 95 to deliver up to four times the performance of a Macintosh Quadra 950 running AppleShare 3.0.

Grows with the group. It's easy to keep up with the workgroup as it gets bigger and more demanding. Memory is expandable to 256MB, and there's room to expand disk storage up to 20 gigabytes.



Workgroup Server

We now do for the workgroup what

When Apple introduced the first Macintosh® computer, we proved that making a desktop computer easy to use could have a dramatic effect on an individual's productivity. Now we'd like to repeat that demonstration on a much larger scale: Introducing the Apple® Workgroup Server 95.

It's an expandable, high-performance server designed specifically to boost the productivity of groups of people in data-intensive environments. And, in typical Apple fashion, it's also designed to be surprisingly easy to use, demanding much less attention from you as a network manager.

The Workgroup Server 95 has been built for speed and optimized to help large groups of users work together more efficiently. Starting with our most powerful Macintosh Quadra® system, we added hardware acceleration, half a megabyte of high-performance cache memory, enhanced SCSI/DMA



The Workgroup Server 95 not only gives the group a growth path, it lets people do things they couldn't do before. Like streamline electronic publishing with centralized art and text files. Or store and retrieve large documents in seconds.

*AppleShare administrative overhead \$10,000 per year less than other systems, according to the Business Research Group (BRG) study "Efficient Computing for PC LAN Administrators." — A Comparative Analysis of 15 Leading NIS Environments. Environments compared were Apple Macintosh Quadra as a trademark and AppleShare as a service mark of Apple Computer, Inc. MS-DOS is a registered trademark of Microsoft Corporation. Netware is a registered trademark of Novell, Inc. OS/2 is a registered trademark of International Business Machines Corporation. OS/2 is a registered trademark.

Copyright © 1995 Apple Computer, Inc.

Built-in network support. With Ethernet, LocalTalk, TCP/IP and AppleTalk software built in, the Workgroup Server 95 fits into just about every office environment with a minimum of effort.

Built-in backup. The optional built-in DAT 4mm tape backup drive lets you store gigabytes of information. Dantz: Retrospect Remote automated backup software (bundled with the server) lets you safeguard system and data files in UNIX and Macintosh formats.

Database power. The Workgroup Server 95 has the power to drive the ORACLE[®] relational database, supporting MS-DOS, Windows, Macintosh, OS/2 and UNIX clients. It also provides enhanced performance for 4D Server from ACI.

Now serving Windows. New software from Apple and Farallon lets MS-DOS and Windows users connect easily to the Workgroup Server 95 and Apple printers.

High-performance support. The AppleAssurance[™] program provides 24-hour phone support to help you set up and start using your server, and on-site service options to keep it at peak performance for a lifetime.

at Macintosh did for the desktop.

driver support, disk I/O, memory expansion to 256MB and disk expansion to 20 gigabytes.

And it's all built around our performance-tuned UNIX[®]-based system software: A/UX[®] 3.0.1. Optimized to deliver stable, dependable file, print and database services as well as UNIX application processing, A/UX features the familiar, intuitive Macintosh interface.

Our new AppleShare[®] Pro software (for file and print services) also offers industrial-strength performance and reliability. But ease of use may well be its most powerful feature.

Built into this software is a range of simple, graphical tools to help you maintain the server, whether you're adding new users, upgrading software or



With the optional built-in DAT drive and backup software, you can automatically store up to 6GB of data on one 4mm tape cartridge without interrupting the group's day-to-day work.

installing network-wide services like e-mail. It also has sophisticated on-line documentation that can be accessed at any time, by keyword or topic.

Soon you'll be seeing more new Apple servers and solutions for every size workgroup and budget. Each one has been made to help people become more productive by sharing ideas and information, and to expand easily as your needs grow. Which means each one is perfectly capable of delivering the most important kind of computing power. The power to be your best.

The new Apple Workgroup Server 95



From the Ether / Bob Metcalfe

Novell counters bogus client/server patent



(a carefully chosen NetWare user) by Roger E. Billings, holder of a 1987 patent on what are now called client/server databases. The news today is that Novell has filed 400 items of alleged prior art in San Francisco with Federal Judge Eugene Lynch, whom I hope will invalidate the Billings patent summarily, long before the jury trial expected in 1994. Today I'm asking whether this case of gross patent abuse is the one we should use, finally, to provoke long-needed reform of our patent system.

After my second Billings column, (April 26, page 52), I called Novell president Ray Noorda to encourage him to fight the bogus patent (to use a familiar phrase) all the way to the Supreme Court rather than settle with Billings. I feared that even an unjust settlement might at some point seem to be in the best interests of Novell shareholders, given the way our lawyer-enriching justice system tends to work. But settling would create, I believe, yet another royalty-extending monster.

Noorda, who for decades has worked to expand the computer industry, told me that he does not intend to damage that industry by settling with Billings. I was thrilled to hear this, but of course, what else could Noorda say?

Also in my April 26 column, I asked for help in getting the U.S. Patent and Trademark Office (PTO) to re-examine the Billings patent. Following that, I soon heard from a succession of inventors and lawyers. They described how the flawed patent re-examination process is rather lopsided in favor of patent holders, and how, if I weren't careful, a

re-examination could easily backfire on me to Billings' benefit against Novell.

Well, I feel it is the purpose of patents to encourage people who know how to invent, not people who know how to abuse the patent system.

So here's a thing that needs fixing. As in other countries, our PTO should open up its examination process rather than routinely issue lightly researched patents, the validity of which must be contested thereafter outside the PTO at great expense among hired expert witnesses, patent litigators, judges, and juries, most of whom are not computer technologists.

Patents should encourage inventors, not abusers of the patent system.

Within hours of being convinced to delay filing with the PTO for a re-examination, the Billings patent to give Judge Lynch time to string the patent up—I received a letter from Billings (which *InfoWorld* reprinted last week, page 62). He characterized Novell's filing of 400 items of prior art as an act of desperation and included a filing-fee check for \$1,000 made out to the PTO, taunting me: "Take your best shot!"

Billings calls me an un-American because, he says, I think that an inventor has no right to receive royalties. But of course I do think inventors should get royalties, it's just that in this case, in my expert opinion, the patent is not valid.

And so just how did Billings get his bogus patent? Having read his patent

"wrapper," I see that Billings first filed his patent in 1982, and not surprisingly, it received a "final" rejection. He "continued" the filing in 1986, and it was again rejected, even on the basis of the scant prior art that Billings submitted. He continued the filing a second time in 1986 and, after getting assigned a new, soon-to-retire examiner, he was issued the patent in 1987.

According to experts who have responded to my Billings columns, patent filing continuations have their legitimate uses, but they are also frequently abused. Continuities let you delay your 17-year patent monopoly, while keeping your early effective filing date (not so early in the Billings case). During the delay, the market may grow, you can update your claims to cover products introduced while your patent was pending, and you get a shot at a new, more agreeable PTO examiner. Let's fix these loopholes.

Unless I am buried in your letters to the contrary, or unless my upcoming interview with Billings turns earthshaking, this is my last Billings column. My files are collecting strange newspaper stories about Billings going back to 1981. In a recent press release from a big time PR agency, Billings has challenged Novell's chief NetWare architect, Drew Major, to a public debate—a blatant publicity stunt.

It's suddenly obvious to me that Billings, for all the trouble he causes, perhaps even more than the royalties he hopes to collect, enjoys seeing his name in the papers.

Bob Metcalfe is publisher of *InfoWorld*. He invented Ethernet at Xerox PARC in 1973 and founded 3Com Corp. He receives E-mail via the Internet as bob.metcalfe@infoworld.com or at 524-1127 on MCI Mail.

How to contact InfoWorld

InfoWorld encourages readers to contribute their opinions for publication. Please send letters to the editor to our physical address, fax number, or letters@infoworld.com on the Internet. For information about *InfoWorld's* reader and advertising services, including full-text access on-line and on CD-ROM, please turn to the Reader Services Page immediately following the InfoMarket section.



Telephone:

Our phone numbers are (415) 572-7341 and (800) 227-8365. The switchboard is open between 8:30 a.m. and 5:30 p.m., Pacific time, Monday through Friday. After 5:30 p.m., our voice mail system will direct you to individual phone extensions.

InfoWorld also maintains news bureaus around the United States, as follows: Seattle (206) 641-7770; Boston (800) 879-0700; Ext. 710; Washington (410) 379-9313; and Dallas (214) 233-4876.



Electronic mail:

We try to provide as much electronic access to our staff as possible. Through various gateways, E-mail is routed to individual's desktop in boxes.

Internet: When sending a message, use the

following form: firstname.lastname@infoworld.com

We have listed our staff on our editorial and business mastheads in the form that they are listed in our internal mail system, so you can use the mastheads as a guide for addressing Internet messages correctly. Please include your full Internet address in the text of your message in case the reply field gets garbled during transmission.

MCI Mail: We have also provided all of our editorial staff with accounts on MCI Mail. All of these addresses appear in MCI Mail's interactive directory.

You may also send to one of these accounts through a gateway by combining the first initial with the last name of anyone on the editorial masthead. (For example, Rachel Parker is rparker@infoworld.com.)

AppleLink: Some of our editorial staff have personal accounts on AppleLink, including Stewart Alsop (ALSOP), Anne Kaliczak (KALICZAK.A), Boh Kayne (KAYNE.B), Kristen Kuster (KUSTER), Lia Brenzano (LIA.L), and Tom Quinlan (QUINLAN.T).

CompuServe: *InfoWorld* has a single account (73267.1537) for receiving letters to the editor and other messages.

CompuServe provides gateways to MCI Mail and Internet. To use gateways in

combination with the addressing instructions above, use the following format at the end of your message:

>MCI:mail:address
>INTERNET:address@infoworld.com
For example, to reach Rachel Parker:
>MCI:mail:rparker
>rachel_parker@infoworld.com



Facsimile:

Our News and Views facsimile number is (415) 358-1269. The Reviews and Testing fax number is (415) 312-0570.



Physical mail:

InfoWorld is located at 155 Bovet Road, Suite 800, San Mateo, CA 94402.

Gripe line:

Got a complaint about a product or a vendor's technical support? Call (800) 227-8365, Ext. 710, to report a gripe. You can also send your gripes to Editor Ed Foster at ed_foster@infoworld.com or to ed_foster@infoworld.com.

INFO WORLD

President/CEO

Bob Metcalfe
Senior VP/Editorial Director
Senior VP/Circulation & Research
VP/Associate Publisher
VP/Reader Service Director
Executive Assistants
Research Assistant

Bob Metcalfe

Jim Casella
Steve Allen
Michael Love
Patricia Crotty
Joe Decker
Joe Allen
Rosemary Neese
Anne Ryder

SALES & MARKETING

National Accounts Director
Director of Demographic Editions
Advertising Director
Sales Administration Managers

Vicki Goren
Steven Davis
Iris Ross
James J. Johnson
Rosemary Laffano

Regional Managers
Alex Daines, Carol Fountain,
Ron Hall, Ramella Hols, Steve Martin,
Steve Meyer, Karen Niles, David Pomeroy,
Joanna Parker, Jim Shannon, Cindy Zuck

Account Managers
Mindy Blankenship, Susan Egan,
Kelsi Flanagan, Shelly Hunkeler, Christine Lewandowski,
John Niles, Kelly Niles, LuAnne Newcomb,
Ann Schmitz, Debra Wells

Sales Support Coordinator
Florence Mahwah

District Sales Manager/So. Calif.
Michael Hamilton

District Sales Manager/Nor. Calif.
David Templeton

InfoMarket Sales Staff
Marc Calvano, Sharon Chin,
Joanne Feigen, Vic Kline, Dennis Mcweeney, Lisa Weller

Ad Coordination Supervisor
Chris Guo

Ad Coordinators
Anne Angles, Christine Corbett

InfoMarket Ad Coordination Manager
Janet Dionisi

InfoMarket Advertising Coordinator
Dorcas Kent

InfoMarket Advertising Coordinator
Dawn Kiser

InfoMarket Design Coordinator
Gary Palmer

InfoMarket Administrative Assistant
Gina Bartle

Director of Marketing
Kevin Ellis

Creative Director
Bob Schorrach

Senior Copywriter
Steven Young

Copy Editor
Christina Ridge

Marketing Coordination Manager
Jo Olson

Marketing Coordinator
Cathy Tuman

Marketing Assistant
Steve Starnes

Director of Circulation
Barbara Ruffner

Assistant Circulation Director
Nancy Starnes

Senior Circulation Director
Debra Querry

Circulation Manager
Michael McShane

Distribution Manager
Stephen Beach

Director of Research
Wally Palmer

Research Analyst
Alison Baker

Research Analyst
Monique Walters

OPERATIONS

Production Manager
Peter Holm

Production Manager
Debra Guffyne

Production Manager
Ester Maroff

Production Manager
John Maitland

Production Manager
Maia Eliza

Production Manager
Rachel Weller

Production Manager
David Swanson

Production Manager
Carol Bennett

Director of Finance
Bob Answorth

Finance Manager
Bob Peterson

Financial Analyst
J. J. Sanders

Financial Coordinators
Jeanne Plot, Grace Duarte

Billing Coordinator
Bonnie Chin

Facilities Manager
Steven Brown

Telecommunications Specialist
Scott Tanner

Office Services Coordinator
Janet Brown

PC Support Manager
David Smith

Receptionist/Activities Coordinator
Linda Simon

Director of Information Systems
Jeff DeSilva

Information Systems Manager
Alan Hols

Technical Specialist
Susan Kiser

Network Administrator
Debbie Wells

Software Specialist
Robert Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

PC Support Manager
Jeff Chang

ENTERPRISE COMPUTING



Apple Open Collaboration Environment

Combining personal communications with workgroup computing

BY DAVID BAUM

You're a manager at a busy electronics firm getting ready for your next user group meeting. You have finalized the agenda and it's time to get approval from the rest of the committee, a diverse group located at various companies around the country. What's the quickest way to get the information out?

One member of the committee is part of your own company. He is easy to communicate with through QuickMail. You simply launch the electronic mail application, address your message, attach the agenda, and send it off.

The next member is easiest to reach through MCI Mail. No problem: You fire up your modem, log in to MCI Mail, track down her MCI Mail address, upload the agenda file, send the message, and then log out. MCI tends to mess up your formatting, but at least she will get the information. You can dial in again in a couple of hours to make sure the message got through.

The quickest way to reach the third member of the committee is by fax. Now, this will involve a bit more effort on your part. You'll have print out the agenda, fill out a cover sheet, leave your workstation, and take the papers over to the fax machine. It's already in use, so you take it to your secretary. She'll send it right after lunch.

It's great to have all these options for communicating, but if Apple Computer Inc.'s Open Collaboration Environment (AOCE) becomes a reality, there will be a much easier way to achieve the same results.

Once AOCE services become wide-

spread, all the people you communicate with can be represented by electronic information cards in your desktop directory. The members of the user group committee could be grouped under a common group icon. To send your agenda to each member of the group, you would simply drag the agenda document to the group's icon.

The rest, as they say, is history. Each person in your directory will have a preferred mode of communication associated with their information record, along with all necessary routing information. You will no longer need to launch QuickMail or log in to MCI or carry documents to the fax machine. It will all be done for you automatically. Each information card includes a known communication path from your desktop to theirs.

AOCE will even remember to send your messages when you are away from the network. Perhaps you finalized the agenda using your laptop computer on an airplane. You dragged the document to the User Group Committee icon and forgot all about it. The next time you plug into a network, the messages will be sent automatically, even if it is days or weeks later.

Sound like an impossible dream? It may happen soon if Apple can succeed with its vision of collaborative computing.

VISION BECOMES REALITY. AOCE consists of a series of modular extensions to the Macintosh System 7 operating system. The modules will provide system-level interprocess and cross-application communications to Macintosh applications. The AOCE functions include mes-

saging, electronic mail, directory services, authentication and privacy, and digital signature capabilities to all Macintosh applications.

- Messaging allows applications to exchange information in a consistent way through a common set of AOCE application programming interfaces (APIs).

- E-mail enables users to exchange letters and documents from within their applications.

- Directory services provide a common point of information storage for communicating with various users and groups of users.

- Authentication ensures users that all communications are kept secure and private.

- Digital signatures allow users to attach reliable approval signatures to documents.

As Apple sees it, these are the essential ingredients of a new type of technology, which they call collaborative computing.

"It's not so much a breakthrough in technology as it is in scope," says John Murphy, vice president of marketing at Shana Corp., in Edmonton, Alberta, Canada, a vendor of electronic forms products for the Macintosh. "There are already digital signature technologies out there, for example. But with AOCE, these capabilities will become commonplace in many applications as regular fixtures on the desktop."

Integrating these communications techniques into the Macintosh operating system is similar to work conducted by the Department of Defense in the 1970s in which the TCP/IP network protocols were integrated into the Unix operating system kernel. That work, conducted for

the DOD by the University of California at Berkeley, spawned a diverse array of products and wide area communications techniques. That work helped spawn the Internet, an immense TCP/IP-based computer network that spans the globe.

Apple's collaboration technology could have equally far-reaching implications for workstation users. Apple President Michael Spindler, speaking at a recent public forum, said PC market growth has slowed to single digits because applications are failing in their mission to create new, more effective ways of carrying out business tasks. Most productivity applications, Spindler says, recreate existing manual processes. To be truly revolutionary, future applications must invent more useful ways of carrying out the chores of industry.

Apple aims to do just this with AOCE—create applications that can be used in tandem to execute the multiple tasks workers must carry out in order to complete a project. With AOCE, and the third-party products it will spawn, these tasks will be reduced to a few clicks of a mouse.

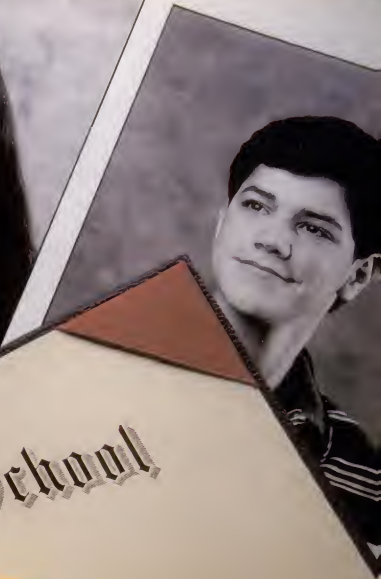
For Shana, AOCE will help cut down the paper trail associated with the creation and routing of forms-based information, such as customer orders and invoices.

"What often causes a document to be printed is the need for a signature," Murphy says. "Once this can be handled reliably on-line, companies will be able to route documents electronically through approval and review processes."

At any point, users can "sign" a document simply by dragging it to their personal signer, Murphy says. The digital sig-



Pep Club 4; Debate Team 4; Tennis
National Honor Society 1, 2, 3



High School



prescribed for Graduation
masters of the Tamalpais Union
hereby awarded this

enty-eight.

Tup
photo

Has satisfactorily co
Tamalpais



Microsoft is committed to providing the fastest, most reliable technical support in the industry.

EVER WONDER WHAT HAPPENED TO THAT BRAINY KID WITH ALL THE RIGHT ANSWERS? WE HIRED HER.

In fact, we've hired 1500 other smart people just like her.

Why? So you can have access to the very best technical support in the industry.

So whenever you call us with a question, you'll get the right answer, right away.

And so you can get your job done easier. Faster. Better. Whether you're discovering the magic of spreadsheet formulas for the first time. Or you're just looking for the smoothest, simplest way to zip around the Microsoft® Windows™ operating system.

The way we see it, as people explore the limits of today's more powerful products, the job of providing support becomes critical.

So at Microsoft, we're doing the most we can to help.

It's like having 1500 good friends in the software business. Or like you're sitting conveniently close to the smartest kids in class. And you get to copy their notes.

Microsoft®
Making it easier

AOCE architecture

Service access module interfaces



nature capability can be used from within in any application, not only to positively identify the person who approved the data, but also to detect whether a document has been altered since it was signed.

Central to Apple's plans is the concept of mail-enabled applications, which will facilitate the routing of such documents. Users will be able to send their work directly from one program to the next rather than the old way of doing things: Quit the current application, launch the E-mail application, type a message, and attach the file.

"A Send command in the Macintosh File menu will become as ubiquitous as the Print command is today," Murphy says. "If you want to send the spreadsheet you have just completed to your co-worker in another region, you can do so without even exiting the application."

Selecting Send from the File menu will return a menu of all users in your directory. You simply select the user you want and let your system handle all the underlying protocols, routing addresses, and inter-application intricacies. Each user information card in your directory will have a chosen mode of address associated with it, as well as an alternate mode if a message doesn't get through by the first mode for any reason.

"Apple has provided us with a solution to a need that we didn't know we had," says Mike Tippets, a technical product manager at WordPerfect Corp., in Orem, Utah, who has helped his company implement AOCE. "It's hard to grasp new technologies until you can see them in action. People were bappy with Liquid Paper until someone brought in a typewriter that had an automatic delete key."

Tippets has put his finger on the major challenge Apple faces with AOCE: helping companies realize that they have a problem in the first place. What is the problem? Lack of collaboration among workgroups, cumbersome workarounds to mask system differences, and a paper trail that doesn't seem to shrink despite the best efforts at automating business processes.

WORKING TOGETHER. Consider another example: a project management application designed for use by a single individual. Typically, a team leader working

with such a program receives schedule and task information from each team member in some manual form, putting together a new project time line at periodic intervals. Not only is this process time-consuming, but team schedules quickly become out of date unless each member conscientiously contributes status reports and updates.

A truly collaborative project management application should automatically remind team members of upcoming deadlines, regularly request status information, enable routing and sign-off of project changes, and interact behind the scenes with other applications, such as calendaring, authoring, and document management. The net result is efficient and effective communication.

Some applications today have made stabs at collaboration, but because these capabilities are implemented at the application layer rather than at the system level, they utilize different conventions and require varying levels of user input. To truly facilitate collaboration among

computer users, a common, system-level communications infrastructure is required. That is exactly what Apple is shooting for with AOCE.

"The loose strands of voice mail, fax, electronic mail, and remote paging will be woven into an integrated communications fabric," says Andy Lauta, Apple's AOCE product manager. "The sending and receiving of messages and documents through diverse media will become an integral part of applications."

"All of a sudden my E-mail becomes my document," Tippets says. "In WordPerfect, after you finish writing a document you simply click on a Mail button and the familiar mail header appears."

At the desktop level, AOCE software provides users with a mailbox icon, a directory browser icon, one or more personal directories, and directory templates. All of the user's correspondence — messages from multiple E-mail systems, voice messages, faxes, paging notifications, documents created in any application, and even QuickTime movies — arrives in the mailbox.

AOCE software also includes a built-in ad-up service that enables users to communicate with one another in a peer-to-peer fashion. Equipped with the appro-

priate service access modules, they can send and receive fax documents from their Macintosh desktops. Those with subscriptions to public mail services, such as MCI Mail, AppleLink, or CompuServe, and the appropriate service access modules can use AOCE as a consistent environment to collaborate with others through these public services.

WHAT'S THE CATCH? The catch is that service access modules must be either obtained from third-party developers or created in-house. Apple's grand vision for collaboration must begin with a massive cooperative effort by other vendors. It is here that the success or failure of AOCE ultimately lies.

"Apple is putting the building blocks in place, but in order for AOCE to be successful, third-party software developers must build their products on top of the AOCE foundation," says Andrew Woolfe, an independent analyst and president of Lipa Strategic Technologies, in Boston. "Any Mac user will find the AOCE services useful, but their real purpose is to provide developers with a fully defined set of APIs to access these services from their applications they create."

How substantial will this development effort be? "It's a fairly easy implementation," Tippets answers, describing his company's recent development efforts to add AOCE compliance to WordPerfect applications. "And the benefits are numerous. The more vendors use the technology, the more users we will find for it."

AOCE itself is currently in beta use, and the add-on modules should be commercially available to third-party vendors and corporate developers by the end of the year. This means that in about six months from now we should start seeing AOCE-compliant products.

Apple is encouraging vendors to get the AOCE services implemented first in their Macintosh products and to stand by for delivery of similar functionality on other platforms. Unfortunately, not everyone is convinced that this is a realistic strategy.

"A lot of Macintosh ISVs are trying to protect their Macintosh product," Woolfe says. "They need to be free of anything that will tie them to a single platform. Consequently, some of them are shying away from AOCE despite all the functional benefits it will bring them. If they allow digital signing on their Macintosh products but can't support those capabilities under Windows, they are dead in the water."

Apple faces a difficult problem, Woolfe says. If they come out too aggressively with AOCE for Windows, it could shift their customers off of Macintosh hardware. They must walk the fine line between adding unique value to the Macintosh platform and satisfying the demands of the industry for functional interoperability.

Yet Shana is comfortable with Apple's directions. "We see it as a staged process," Murphy says. "It will take a while before customers even start using the pieces on their Macs. We're confident

that AOCE will be ready for cross-platform implementation in a reasonable length of time."

On the other hand, Mitch Miller, director of technology at CollegeView in Cincinnati and a former multimedia specialist at Apple Computer, has decided against AOCE for his company's college database application, currently running on the Macintosh. He says even if AOCE makes it to Windows, there are countless other platforms that lack the requisite graphical functionality for AOCE-type processing.

"Our Macintosh application must communicate with different types of mainframe systems at colleges across the country," he says. "They aren't as sophisticated as Macintosh or Windows on the user side."

RIVAL SCHEMES. Apple's plans are well laid, but other vendors have similar schemes. To the victor, the spoils are rich: nothing less than control of the corporate application environment. Microsoft Corp.'s Messaging Applications Programming Interface (MAPI), Lotus Development Corp.'s Vendor Independent Messaging (VIM), and the X.400 API Association's X.400 are all vying with AOCE to become the industry standard for cross-platform, interapplication communication.

But Apple and industry observers claim these other services aren't on par with the potential of AOCE. "MAPI enables mail-capable applications for Windows, but it lacks many of the unique functions of AOCE, such as the electron-

Apple fosters teamwork with integrated communications

AOCE consists of the following modular extensions to System 7, making communications an integral part of personal computing:

- **Messaging:** Allows applications to exchange information
- **Electronic mail:** Enables users to exchange letters and documents
- **Directories:** Provides an information store required for collaboration between applications and users
- **Authentication/privacy:** Ensures users that all communications are secure and private
- **Digital signatures:** Allows users to attach reliable approval signatures to documents

ic business cards, digital signatures, and security," Lauta says. "AOCE integrates all these pieces at the operating system level. You can't get that on Windows today."

"A lot of people are talking about E-mail and messaging," Lauta continues. "And certainly AOCE supports these things. But ultimately it is about something much larger, a new computing paradigm. We're combining the concepts of workgroup computing with various forms of electronic communications in a very robust way."

Tippets echoes Lauta's enthusiasm. "As more and more vendors implement the AOCE specifications into their products, the number of people we can communicate with, and the ease with which we can communicate with them, will blossom." □

David Baum is a Santa Barbara, Calif., writer specializing in PC and Macintosh application issues.

ENTERPRISE COMPUTING / MANAGEMENT

PC managers consumed by software upgrades

But automating software distribution is a daunting task in complex LAN environments

By Doug Van Kirk

What's the biggest time-waster in PC administration? Ask any support manager and they will tell you it's the tedious, repetitive task of installing software. Schlepping applications from one workstation to the next is about as much fun as watching hard disks format.

But there's a better way, and it's not a robot arm to slog disks in and out of the A: drive.

The solution is automated software distribution — network administration tools that can install new applications and update existing software quickly, with a minimum of human intervention.

But the lack of desktop management tools and inconsistencies among software installation procedures has made it difficult to develop tools that work with a broad range of software.

Despite the difficulties, there is pent-up demand for software distribution tools for PC LANs, which has prompted several leading software publishers to embark on software distribution projects. Microsoft Corp., for instance, will incorporate software distribution into its forthcoming network management application, Hermes. Hewlett-Packard Co., in the meantime, has announced that LAN-based software distribution will be available with HP OpenView, an integrated network administration package. And Novell Inc., through last year's acquisition of software distribution tool maker Annatek Systems Inc., is also well positioned to jump into this market.

A BETTER WAY. Manually installing software is labor intensive and expensive. Support costs can exceed the price of an application by as much as 10 percent, according to studies by the Gartner Group, a Stamford, Conn., market research firm.

Technicians updating typical word processing programs can spend as much as an hour on each workstation. The support costs can quickly mount in companies with hundreds or thousands of users.

Despite the obvious need, IS managers have been hesitant to purchase software distribution tools. "Users are gun-shy," asserts Allen Falcon, president of Net-

Source, a Boston-based systems integrator. Automated software distribution (ASD) is new to the LAN environment, he adds, and early horror stories have made IS professionals wary of the product category.

Vendors have had a hard time defining ASD tools, says Jim McConnell, vice president of Infonetics Research, in Boulder, Colo. Early products distributed copies of software but didn't install or configure programs, he says. That has led to some confusion among network managers, who already have their hands full just keeping their networks running.

COMPLEX UNDERTAKING. Why is it so hard to build a tool to install software? The answer: What seems like a simple task is actually quite complex. Practically every program has different installation and configuration routines. Setup information (such as default directories and file extensions) is stored in .INI files for some programs, in .CFG files for others, and sometimes in the executable itself. There's no easy, universal way to look at an application and determine its current settings or instruct it to select new configuration options. Some programs create dozens of subdirectories; others need just one. Communications programs may need a driver present before they will operate; database programs sometimes require a larger FILES statement in the CONFIG.SYS. The list goes on and on.

And the problem isn't just with the applications; "compatible" systems are often set up differently, with different video cards and network adapters that use different addresses or interrupts from ma-



PAMELA DUBBY/WATKINSON

chine to machine. These differences can freeze an application if it is not configured properly. Yet there's no easy way for an ASD tool to take inventory of a machine and its capabilities. Even if there were, there would be no way for it to modify an application's configuration information unless it was specifically set up for that application.

It's all part of the network administration equation. Without control of the desktop and standardized applications, it's impossible to build universal software installers that can remotely download an application and configure it appropriately for the user. Software vendors need to design software with administration features built in, McConnell says.

WHAT DOES WORK. Automated software distribution can work, however, with specific applications in reasonably well-controlled environments. Although it might be better called semiautomatic software distribution, companies are reducing the time needed for major upgrades. However, this requires a fair amount of planning and preparation by the information systems department. For example, ASD has worked well for the Prudential Select Marketing Co., in Minneapolis. According to network specialist Ray Ehrlich, automatic updates of NetWare shells and drivers as well as remote edits of CONFIG.SYS and AUTOEXEC.BAT files are making life easier for the network staff.

Ehrlich is using a product called SUDS (Software Update and Distribution System) from Frye Computer Systems Inc., in Boston. SUDS can assist installation by copying files to attached PCs or by using keyboard macros to run an application's installation routine. Ehrlich plans to use SUDS to update system files on about 450 PCs throughout his company. However, Ehrlich cautions that SUDS

is only appropriate in environments where the desktop machines are limited to a few particular configurations, such as 4MB PCs with VGA cards and Ethernet adapters running DOS 5.0. SUDS includes system "sniffing" capabilities to assess the hardware of the target machine. The administrator uses the application's setup routine to install the software using the configuration information of the target machines. SUDS then copies the installed application to target machines that are configured similarly to the original. Of course, the administrator can also limit distribution to users or groups.

PRESS ANY KEY... The alternative is to run the application's own installer on each target machine, using a file server as a source for the installation files and keyboard macros to answer setup program questions. This can take a considerable amount of work, as the administrator may need to write a fairly sophisticated set of instructions to accommodate the installer.

For example, the installer may ask the user about the video card and issue a prompt for a driver diskette. The administrator's routine needs to capture that query, determine the correct answer, and reenter the setup routine to a directory containing the drivers on the server.

Obviously, it takes time to set up this type of installation; this approach is best for large installations where hundreds of users need to be updated.

No matter which technique you use, you need to use appropriate safeguards to ensure the process can be undone if the installation fails. Even a small percentage of aborted installs can tie up a support team if there's no quick way to restore end-user systems to their previous state while the problem is being resolved. Lack of "uninstall" functions in commercial software is a major complaint of users, notes Russell Frye, president of Frye Computer Systems.

Much work needs to be done before truly automated software distribution can become a reality in LAN environments.

Software distribution will not really take off until application developers include standardized installation routines that can be easily controlled by other programs. At the very least, programmers need to base their setup programs on a universal system information file that can be modified by system administrators. This may be on the way, for future Windows applications, anyway. The next edition of Microsoft's software development kit for Windows will include "tools and suggestions" that will encourage developers to adopt standardized installation routines, says Ruth Warren, a senior product manager for corporate and network system at Microsoft.

With the amount of time spent installing and updating files, it's clear there's a need for better tools, says Infonetics' Jim McConnell. "It's going to be a huge market for anyone who breaks through." □

Software distribution products

Vendor	Product	Availability	Pricing
Microsoft Corp. Redmond, WA (206) 882-8080	Hermes	Fall 1993	Unavailable
Frye Computer Systems Inc. Boston, MA (617) 451-5400	SUDS	Shipping	\$995
Hewlett-Packard Co. Cupertino, CA (800) 637-7740	HP OpenView Software Distributor	August 1993	\$4,400 - \$42,700
Novell Inc. Boulder, CO (800) 821-9528	Network Navigator	Shipping	\$200 per client

Case Study

Ladies and gentlemen, start your microprocessors

Indianapolis 500 racing team makes innovative use of off-the-shelf PC technology

BY PATRICK LYONS
AND HELDER ANTUNES

If you want to see an example of high-performance computing, look no further than this past weekend's Indy 500 race. Today's racing teams are using the latest desktop and mobile computing technologies to wring every bit of performance from their cars and drivers.

This is no Sunday drive. The need to process information effectively is no less important for racing teams than it is for corporate America. At stake are personal reputations and millions of dollars in sponsorships. The right information can mean the difference between winning a race and blowing an engine, or possibly even crashing.

Of course, computers aren't new to automobiles in general or race cars in particular. Computerized engine controls and computer-aided design programs have been used by builders of racing and street cars for years. What's new is the integration of these technologies with extensive real-time data acquisition and modeling. Laptops and LANs are providing today's racing teams with insights into their cars' behaviors and the ability to make on-the-fly adjustments.

In fact, racing teams are loading up on the same hardware and software found in the office to optimize their cars and drivers. PCs and laptops, combined with extensive databases of performance statistics, are helping to spot trends and optimize how a car will perform in a given environment.

The racer's adage that there's no substitute for horsepower still holds true, of course, but optimizations that once took days of trial and error and no small amount of intuition can now be calculated instantly with PCs. Engine performance data from previous races, for example, can be combined with optimum speeds calculated for a particular course to generate the best set of gear ratios for the transmission.

SPEED DEMONS. Making cars faster, of course, is what it's all about. "In the racing business, winning is your only goal," explains John Faivre, an electronics engineer with the Marlboro Penske racing team. "We use all this computer information to learn more about the performance of the car," he adds.

Faivre has been applying information technology to race cars since 1986, when he worked for a team sponsored by consumer electronics giant Emerson Electric Inc. At that time, he was asked to design a real-time data acquisition system to gather relay data from the car to the pit crew and engineers during a race.

His current system continues to use a radio transmitter installed in the car to capture data from the engine's sensors and send it back to radio receiver-equipped notebook computers in the pits. Outfitted with more than 3MB of RAM,



Laptops put Penske on winning edge

WHO: John Faivre

WHAT: Electronics engineer

WHERE: Marlboro Penske racing team, Reading, Pa.

PROBLEM: Capturing and analyzing a broad range of environmental and operational data from formula race cars.

SOLUTION: A "black box" telemetry system attached to the engine feeds real-time information to laptops running off-the-shelf applications, such as Lotus 1-2-3 and Microsoft Excel. A PC database stores historical data for future analysis by the race team.

MOST SURPRISING LESSON LEARNED: With each race or practice generating more than 3MB of data, the project is generating more information than can be analyzed.

QUOTE: "Investing in PC technology" wasn't really a business decision—in the racing business, winning is your only goal."

the "black box" monitors up to 75 different conditions, ranging from engine revolutions per minute, oil pressure, and turbo boost to suspension travel and fuel consumption.

"We use the telemetry data during the race to determine how much fuel is on board and how fast we are using it and to make sure there are no unsafe conditions developing in the car," Faivre says.

A key feature is the ability to reprogram the car's computers to alert the team and drivers of the conditions critical to a race. Unlike traditional engine monitoring systems, Faivre can set thresholds as he wishes and use the computer to help him keep an eye on particularly critical areas, which may change from race to race. It's a system that actually has more in common with stock trading and factory automation software than engine controls.

NOT THE END OF THE ROAD. After the race, the vital statistics are uploaded to a file server in a support van. The server has a 680MB optical drive with data from oth-

er races and events, which gives Faivre and the rest of the team historical context to evaluate the data again.

Marlboro Penske has four engineers who spend hours analyzing the data after every race or practice session looking for clues or trends to maximize performance. After a typical practice, the engineers (two are responsible for the electronics and the other two take care of the chassis) review the data with the driver, the team manager, and the chief designer. "We probably spend 2 hours looking at data from only 30 minutes of racing," Faivre says.

Although the engineers analyze most of the data after a race, some of it is used by the driver on the course. A dashboard-mounted LCD shows much of the telemetry data and has programmable alarms to alert the driver to critical conditions. The driver can also use the system to make minor adjustments, such as the amount of turbo boost, using the readout as a guide.

With a total annual budget of just \$15 million to \$20 million and engines that

can cost as much as \$100,000 to rebuild, Faivre does not have a lot of money to throw at systems or custom applications. Off-the-shelf software is used wherever possible. For example, Microsoft Excel and Lotus 1-2-3 are used to determine gear ratios, and Symantec's Q&A keeps track of the parts inventory.

FAST TRACK. By far, the most impressive part of the system is the "black box" that resides in the car and monitors engine functions. It includes 3/4MB of RAM and an analog-to-digital converter and can store the data it captures or transmit it back to the pit.

The black box is critical to the operation, Faivre says. "If the system fails we have to resort to estimating pit stops, the driver has to shift by ear, and he can't adjust the boost because he doesn't know what the current setting is."

In fact, the systems can actually do too much. Recent changes to the rules governing Indy-style cars now prohibit computerized functions such as traction control, automatic transmissions, or active suspensions (which replace conventional shock absorbers with computerized dampers that can help a car corner faster). In other races, such restrictions do not apply and the team constantly adjusts the car for each section of the track. The system does not diminish the driver's role in any way, according to Faivre.

Keeping drivers happy, of course, is an important goal for the team. And Faivre's data capture and analysis system seems to be doing a good job of that, as well.

"I believe the electronic aspect of the car is very important," says Emerson Fitipaldi, one of Marlboro Penske's drivers. Fittipaldi notes that one of the most important benefits of the system may be one that was never part of the design.

"It keeps the driver honest about his performance," Faivre says. "If the driver exaggerates his account of what transpired on the track, the team engineer can easily dispute it."

Is the system paying off? Faivre thinks so, but luck also plays a big role in racing. "We're still gathering more information than we can digest," he says. In the future, Faivre says, "If the driver exaggerates his account of what transpired on the track, the team engineer can easily dispute it."

Faivre, Fittipaldi, and the rest of the Marlboro Penske crew have proven to be a world-class operation, and their record speaks for them. Incorporating high technology and on-board computers into formula racing has had a dramatic effect on the performance level of the cars and on the safety record of Indy racing. □

Patrick Lyons is a technical analyst in the InfoWorld Test Center. Helder Antunes is a professional race car driver.

Down to the Wire / Nicholas Petreley, Nancy Durlister, Laura Wonnacott

Enterprise Team ponders network utopia and ill-mannered packets

Now that our TCP/IP comparison is finished, we can turn our attention to a project we've had simmering on the back burner. We're exploring ways to increase internetwork performance. The first item on our list is the Artel StarBridge Turbo, which offers a semi-intelligent way of sorting network packets among multiple servers.

A VISIT TO UTOPIA. The benefits and difficulties of bridges, routers, and intelligent switches tend to get lost in all the hoopla surrounding network operating systems (NOSes). Take for instance the media attention recently lavished on Microsoft Corp.'s Windows NT and Novell Inc.'s NetWare 4.0. While a speedy and robust NOS is an important factor in a corporate information architecture, it's not the only factor in the complex performance equation.

This oversight tripped up a sales pitch we submitted some time ago. A well-intentioned Univel Inc. salesperson was trying to convince us that UnixWare is a superior network alternative to Windows NT. He argued the benefits of the NetWare/UnixWare synergy. NetWare has the fastest file and print services on the market, the salesman said. "I'm sure you've noticed that you can access server-based data faster than your workstation's own hard disk."

You could see the IS managers in the audience squirming in their seats, wondering what kind of network utopia this guy was talking about. Maybe you can tip the scales in our lab, we thought, but more to performance on a real network than how fast the NOS can pull data out of a cache. There's the wiring, network cards, and traffic bottlenecks, to name just three additional factors.

Ideally, you can minimize bottlenecks if you have an unlimited budget and mys-



tical foreknowledge of future needs. But if your network is ever growing, as ours is, it's not always that simple. Like many of you, we started small and expanded as budget, space, and business allowed.

We've found that dividing the corporate LAN into segments helps minimize bottlenecks that result from rapid growth. And the Artel StarBridge Turbo might be just the device we need to eliminate some of the kinks that result from unforeseen growth spurts.

Here's a simplified description of our internetwork. We occupy three floors of an eight-story building. Each floor has a wiring closet where all workstation connections terminate into a wiring concentrator. A single line from each floor terminates in our systems department, housing three NetWare servers.

Back when we installed these servers, we contracted out to a think tank of creative geniuses who, after a marathon brain-storming session, came up with the names IW1, IW2, and IW3.

A line from each floor is connected to a network interface card (NIC) in that floor's dedicated server. We added a NIC to each server and connected these three

additional cards to one another via a local concentrator, constituting our backbone.

RUDE AWAKENING. So let's look at how these servers and workstations converse, so far. You have these three servers standing around chatting over cocktails. Right now, IW1 is getting nowhere trying to make sense of a conversation between IW2 and IW3 about polymorphism in object-oriented programming. Along comes this IW1 user with a confidential question for IW3. He's not on direct speaking terms with IW3, so he whispers it in IW1's ear and asks him to pass it on. IW1 then announces the question right in the middle of an exchange between IW2 and IW3 about multiple inheritance. IW2 mutters, "How rude," and ignores the question. To make matters worse, IW3 then shouts the answer back to IW1, once again right in front of IW2, who bristles at being out of the etiquette. IW1 then announces the answer to the IW1 user and all his pals.

Obviously, this is not only offensive to Miss Manners, it is an inefficient way to communicate. Messages have to be passed from one server to the next, and one or more servers are getting bothered with information they don't need.

One method of sorting out a conversation like this is segmentation, and that's where the Artel bridge comes in. Artel's StarBridge is a high-speed switching hub designed to increase network performance by passing information to its destination without the other machines having to be in on the conversation. In our cocktail party, it would let our IW1 user talk directly to IW3 without bothering IW2 or IW3.

The StarBridge doesn't stop there. Artel's big claim to fame is its capability to check each incoming packet, forward-

ing the good ones and discarding the bad.

PLUG AND PRAY. The first thing we do to test the bridge is install it in our production network. Artel promises ease of installation, so we figure we'll be able to take down the network one evening for about an hour, install the bridge, and presto—business as usual.

We plot our strategy carefully. We unplug the wires from the concentrator that connects our three servers together, and then plug them into the Artel bridge. Then we unplug from the three servers the wires coming from the different floors, and plug them into the bridge. So far, we're talking minutes. Each server is left with one unused network interface card, so we want to remove those cards. We'll have to edit the NetWare startup files to remove the protocol bindings for those cards. Plug and play? Well, maybe not technically, but why quibble. Add a hub to the network.

The Artel box, like other products of this type, makes everything on the network seem like it's on the same network segment. So a little more start-up file editing is in order to reset the servers' network numbers to be the same. We wonder about the repercussions that changing network numbers might have on the rest of the InfoWorld internetwork.

It's beginning to sound like plug and play means plug it in and play with it until it works.

Are we having fun yet? Stay tuned. We won't show you just how much playtime we're devoting to our new toy.

Down to the Wire chronicles the ongoing adventures and misadventures of our InfoWorld IS task force, the Enterprise Team. E-mail can be sent via the Internet to nicholas_petreley@infoworld.com.



Help Desk / Brett Glass

Parking your head is a safe way to prevent hard drive damage

Our office uses Zenith SlimsPort 286 laptops with Conner 20MB hard drives. Users are instructed to park the heads using Zenith's SHIP.COM before powering down. I have recently found that one should not use head parking utilities on Conner drives because these drives already park their heads when they're turned off. This article went on to say that repeated use of a park utility could damage a drive. Is our use of SHIP.COM shortening our laptops' life?

Eric Rusten
Ford Foundation, Nairobi

The answer depends on the parking utility. Steve Gibson, our resident hard disk reliability expert, says that there once were some parking utilities that attempted to move the drive heads too far inward, potentially hurting the drive. But there's never any harm in using a properly written utility—one that moves the heads to the innermost cylinder and does not try to go farther. I recommend that your employees continue to park the heads before traveling.

If we move 100 percent to Windows applications, is there any reason for us to use a memory manager, such as QEMM? When we're using Windows, does it matter if we load device drivers and TSRs high? Is expanded memory ever necessary?

Randall Core

If you're working in an absolutely 100 percent "Windows-only" environment, you may not need to use a memory manager other than HIMEM.SYS. Windows applications won't care if you clutter up conventional memory with TSRs, as they are not restricted to running there. And expanded memory is not necessary, as Windows doesn't need it and allocates expanded memory for DOS sessions itself.

But a memory manager can be a lifesaver if you fall back on DOS for tasks that must execute reliably, use DOS utilities to tap the full power of your computer without Windows' overhead, use Windows as a multitasker for DOS programs, or run any memory-intensive DOS program inside or outside Windows. Each byte you save in conventional memory is multiplied by the number of

DOS sessions, and memory manager vendors are readying utilities that can give you as much as 720KB or 736KB of conventional memory in a DOS session. Finally, certain maintenance tasks that are best done outside DOS (such as defragmenting and surface testing) can use the extra conventional memory provided by a memory manager.

What's the best way to add more disk space to a machine with a run length limited (RLI) drive without throwing away the original drive?

Don Kava

Get a SCSI hard disk and SCSI host adapter card to supplement your current drive. SCSI drives, although slightly more expensive than integrated drive electronics (IDE) drives, will coexist with any type of drive. And you can add up to seven SCSI devices per host adapter card, so you won't run into trouble if you want to expand further.

I have noted the high quality of InfoWorld's Windows screen pictures. I often need to make hard copies of Windows screens as well, but I have found

that the quality of the output on Hewlett-Packard LaserJet IIIi is less than ideal. How can I import screens into to Word for Windows and other programs so that they print well?

Gerry Grimm

According to InfoWorld art director Ben Barbante, a wide variety of screen-capture programs are used to convert Windows screens to PCX, TIFF, and encapsulated PostScript files. The captured screens are then imported into QuarkXPress. Chances are InfoWorld's screen shots look better than yours mainly because we print the screens in color and at high resolution.

You may be able to improve the quality of the screen images produced by your LaserJet IIIi by using Windows' Control Panel to create a black-and-white color scheme.

Brett Glass' Help Desk answers readers' business computing questions. Brett cannot answer questions personally. Readers can leave questions by calling (800) 227-8365, Ext. 702, or by messaging ComputerShare (7267,3673) or on the Internet at brett_glass@infoworld.com.

Two PCMCIA 2.0 Slots,
Type II (5mm) and
Type "IV" (16mm):

Twice the expandability.
Easily accepts multiple
cards including hard disk
drives, modems and net-
work adaptors.



3:45



LCD Status Bar: Delivers an instant read of the battery life remaining, power-saving mode, and a host of other key notebook settings.



Blazing 33MHz i486^{SL}:
With built-in coprocessor
support, delivers the
ultimate in notebook
processing power.

Some say the T4600 is Because in life, there

T4600C

- 9.5" color active matrix TFT-LCD screen
- 120/200/340MB HDD
- 6.9 lbs.
- NiMH battery

T4600

- 9.5" high-contrast, black and white LCD screen
- 120/200MB HDD
- 6.4 lbs.
- NiCd battery

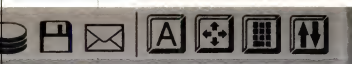
BOTH MODELS

- Intel 486SL/ 33MHz, 3.3 volt processor with 8K cache
- 4MB RAM expandable to 20MB
- Type II (5mm) and Type "IV" (16mm) PCMCIA slots
- BallPoint™ mouse w/QuickPort™
- Toshiba MaxTime™ Power Management system, and extensive 3.3v components provide industry-leading battery life.
- Pre-installed software:
DOS 6.0,
Windows®
3.1, and
UltraFont™



Large 9.5" Color Active Matrix TFT-LCD Screen: This exceptional technology delivers spectacular color for vivid graphics and dazzling presentations.





BallPoint™ Mouse with QuickPort™: Attaches easily, without messy cords, for ergonomically ideal input—perfect for Windows® applications.



Replace Your Desktop: Just snap your notebook into the Desk Station IV, and you're instantly connected to your printer, VGA monitor, mouse, and full-size keyboard. Now you only need one computer.



better than life itself. is compromise.

Introducing the T4600 Series. Make no compromise.

Get the awesome power of a 33MHz i486™ SL processor, and don't sacrifice battery life. Add a 9.5" color active matrix TFT-LCD screen, and access all 185,193 eye-popping VGA colors. Pack a massive 340MB hard drive and never have to leave a file at home.

Get your hands on the BallPoint™ mouse, snap it into its QuickPort™, and never waste a moment or a motion.

Carry two slots for industry-standard PCMCIA cards—including one large enough for the new generation of removable hard drives—and take the next big step in peripherals.

Glance at the QuickRead LCD status icon bar for an instant read of battery life, power management, keyboard settings, and more. This is no time for compromise. This is the time to get your hands on the T4600 Series.

For a dealer near you, call 1 (800) 457-7777.



In Touch with Tomorrow
TOSHIBA

Civilized Computing / Cheryl Currid

To Little IS Bo Peeps: flock to the '90s techno revolution



I am seeing far too many corporate IS managers looking like lost little lambs in glass houses. Some are still licking their wounds wanting and wishing for a single technology leader to tell them what to do and when to do it. To them, I say it's time to grow up — stop making excuses, get over it, and get going.

One debilitating factor facing more than a few IS shops is simply senior IS management's lack of education. CIOs, directors, and managers don't have a clue when it comes to dealing with networking options, "open systems," and multivendor technology.

After all, in days of old, lots of IS managers never had to know too much. All they had to do was listen to their IBM marketing representative, memorize a few three-letter acronyms, delay use-sponsored projects with talk about the next "statement of direction," and put together their budgets for the next mainframe upgrade. It was a pretty predictable job. The IS manager was in complete control and could (and often did) say "no" at will.

Things are different now. Senior corporate managers have gotten a lot more savvy about computing; corporate users are ready, willing, and able to make decisions for themselves; and no single technology vendor rules the corporate computing world. IS managers who don't hurry up and start dealing with the new

reality simply won't last long. Even if one is knocking at the door of the "glass house" demanding new things today — someone soon will.

Therein lies the problem. Many IS shops are pitifully ill-prepared for that knock on the door. I can't believe the number of companies that still don't have effective LAN-to-WAN strategies, effective E-mail, or electronic ordering systems. This is 1993, yet I've recently seen some business procedures that make me feel as if I had taken a wrong turn and landed back in 1893. Grow up — net-

business gets anything right. Its employees log every transaction by hand. Sure the information eventually ends up in a computer, but only after being handled by six to eight pairs of hands.

It gets worse. This same company has still to discover E-mail. Despite the fact that it operates globally, this company simply hasn't gotten its E-mail act together. Nobody has taken the charter or charge to implement a sorely needed way of gluing the company's talented people together. No, no, the business people have to communicate by phone and fax

Therein lies the problem. Many IS shops are pitifully ill-prepared for that knock on the door.

works and open systems are no longer bleeding-edge technology.

It's time to replace or re-engineer business processes and old systems. Besides, nobody gives awards to organizations that keep legacy systems around. What you might get instead is a pink slip when people figure out what they are missing.

Take one company — which I will spare the embarrassment of mentioning by name. This major (really big) buyer and seller of consumable goods is still doing so with paper, pencils, five-part forms, and pick tickets. It is amazing this

and hope to keep their telephone tag down to 20 percent of productive time. Can you imagine the lost opportunity for white collar workers who spend upwards of 8 to 10 hours a week chasing each other around with telephone calls?

Recently the top management committee, fresh from reading articles in *The Wall Street Journal*, *BusinessWeek*, and assorted airline monthly magazines, decided to call in a consultant to evaluate the company's technology. These executives were very real — real mad because they felt they had fallen behind.

The Network Curmudgeon / David Strom

In the fourth era of communications, we have good choices



It seems we are at another watershed moment in the 3270 communications business, as highlighted by Novell Inc.'s recent sale of its 3270 client software to Attamatch Corp. This is good news, because it represents the maturing of client/server products after long being hyped by vendors and the press alike. Let me explain.

The first era of 3270 communications was when we had 3270 terminals connected via coax. This era is still with us, and there are even some corporate customers still buying these beasts: The price is right (ultra cheap), they never break, and they are easy to configure. They are easy to use, although there are some people who still like to use character-mode screens in their jobs. (Hey, look at me: I'm using character-mode software to write this column, even though I run Windows and Word for Windows.)

OK, for most people this first era ended in the mid-1980s. In the second era, people used PCs with the Irma board from Digital Communications Associates Inc. (DCA). We still had lots of coax, and we still had the same character displays, but now we could switch between the 3270 session (which was supported via DCA's software) and the PC DOS session. Of course, we could not cut and paste text between the mainframe and PC files, but at least we didn't have to devices on our desks or have to log off

the mainframe just to run a spreadsheet.

The third era came about late in the 1980s when LANs came into their own. This saw the replacement of coax with Token Ring or Ethernet cabling and the use of PCs as hosts. In the third era, the PC acted as a 3174 master controller and the other PCs ran some kind of client software to talk to it.

This wasn't quite client/server computing yet: These products usually required specific protocols and client software to work, took forever to install, and re-

Manufacturers are deciding on which side to sell products: client or server.

quired lots of people skills on both the mainframe and PC LAN side.

Not anymore. Today we're fully into the fourth era of 3270 communications, what we pundits call the client/server scene. Now you can pick your client (a piece of software that contains a 3270 emulator that runs in a variety of configurations, including some nice Windows versions), pick your server, and book them together. This is what makes client/server applications appealing: the freedom of choice, provided all the ven-

dors involved support all your choices. For example, most of the client-side pieces can now work with gateways offered by Novell Inc. and DCA just fine, in addition to their own.

So what happens? Manufacturers are beginning to decide on which side of the fence they want to sell products: either the client or the server side. Take Novell, for example. A few weeks ago, Novell decided to get out of the client-side 3270 business and stick with the server side. Novell sells NetWare for Systems Application Architecture (SAA) server software, which is a series of NetWare Loadable Modules that run on a NetWare server. The company decided to sell its line of client products (which it had acquired from CXI) to Attamatch, which has its own line of 3270 products, including some clients that can talk to the NetWare for SAA server.

This was a good move, not just because Novell has 80 percent of the 3270 server business, but because it focuses the company in the places where it does the best. Selling its 3270 servers alongside other kinds of servers. As for Attamatch, it now has two distinct lines of client-side software and can bolster its own market share. A win for both sides.

Besides Novell, at least two other server-side products in the 3270 communications world make use of client/server technology: DCA/Microsoft Corp.'s Select Communications Server and IBM's Communications Manager. Both run on OS/2. Microsoft wants to move

You see, the top IS manager of this enterprise is a little sheepish about installing new technology. He is simply afraid of his own shadow and frequently runs back to his office at the first sign of talk about technology he doesn't know.

He's full of excuses. First he'll tell you his company doesn't have more advanced technology because corporate management is unconvinced of technology's value; he can't install what they won't pay for. Then, if you ask a few more questions, he'll tell you why multivendor networking technology won't work for his organization. Heading up this list are concerns about security, reliability, scalability, and availability. Nice try, but all those can be countered with a few facts and a well-configured network — if you know your tools and technologies.

The problem with this lost lamb (and others) is he just doesn't know, and he assumes things won't work. That stance is a shaky one — especially if somebody comes along with a solution that works when the IS manager says it won't.

Today's IS managers need to run, not walk, into programs that teach them something about the capabilities of new technology. It's time to get out of the glass house before somebody comes along and shatters it.

Cheryl Currid, president of Houston-based Currid & Co., focuses on helping clients assess, apply, and organize for new information technology. Her ComputerServe address is: 75300,2660.

the product over to NT, but until NT is actually nailed down, it still has to live with OS/2. IBM's Communications Manager used to be part of Extended Edition but is now a separate product and perhaps one of the more compelling reasons for using OS/2 in corporate America.

There are lots of client-side pieces as well: Wall Data, Attamatch, IBM (with multiple products), DCA (with multiple products), including two lines of Macintosh emulators, and several other companies.

So why is this a watershed event? Mainly because you can now pick your partner. A few years ago we were still arguing over which version of HLLAPI (the interface that allows PC software to script the 3270 screen and put information into a PC program or move it from the PC up to the mainframe automatically) functions were supported by which version of 3270 emulator software. Thankfully, we are out of that business. A few years ago, you couldn't get two different DCA products to talk to each other. Now they share some common code and features.

And now it seems that companies are taking sides between selling clients and selling servers, and I'm glad to see it.

David Strom is president of his own consulting firm, in Fort Washington, N.Y. He can be reached via MCI Mail at dstrom/3193660 or via the Internet at dstrom@radiomail.net.

PERSONAL CLOTHING).
packs, tents, and cooking gear, but not
e enclosed packet for full details.

es, and so forth. To make sure you boots
climbs, see full information in the enclosed

currency for **Drag-and-drop editing** given
packet for full details.

sightseeing in addition to mountain

Edit View Tools + -

You may join the tour at any time (cost is broken down by cou
we recommend that to get the most out of the experience, you
the entire excursion. Exotic Excursions will take care of these

❖ **ALL OUTDOOR GEAR (EXCEPT PERSONAL CLO**
For example, we supply packs, tents, and cooking gear, b
rain gear. See enclosed packet for full details.

❖ **ALL CLIMBING GEAR.**
Ropes, crampons, ice axes, and so forth. To make sure yo
suitable for these climbs, see full information in the encl

❖ **LOCAL CURRENCY AND MAPS.**
All the maps you need, currency for the first day in any g
Again, the

We've included some time for sightseeing in addition to moun
so plan to bring any clothing and spending money that you wil
casual travel. We hope you can join us - *it will be an adventure*

Edit View Tools + -

AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY
		1 Leave New York for Paris	2 Rest one day at L'Hotel du Roi
6 Preparation	7 Lines and borders Climb	8	9 Climb

Enclosed is the information you requested ab
Our specialty is *adventurous travel by foot*
will include climbs in France, Switzerland,
planned itinerary for the trip.

You may join the tour at any time (cost is b
However, we recommend that *to get the most o*
you should sign up for the entire excursion.
care of the

One-step formatting

ALL OUTDOOR GEAR (EXCEPT PERSONAL CLOTHING).
For example, we supply packs, tents, and coo

information you requested about EuroClimb!
adventurous travel by foot and this year's
ly. Here is the planned itinerary for t

DATES	COST (U.	
AUGUST 1-14	2953	4 x 6
AUGUST 15-SEPTEMBER 3	2126	
SEPTEMBER 4-23	Automatic tables	
SEPTEMBER 24	473	

Symbol

Symbols From: [Printer.....]
Symbol: ▲

☐	!!	▲	ë	ö	f	½	↑	↓	↔	↕	↖	↗	↘	↙	↚	↛	↜	↝	↞	↠	↡	↢	↣	↤	↥	↦	↧	↨	↩	↪	↫	↬	↭	↮	↯	↰	↱	↲	↳	↴	↵	↶	↷	↸	↹	↺	↻	↼	↽	↾	↿	⇀	⇁	⇂	⇃	⇄	⇅	⇆	⇇	⇈	⇉	⇊	⇋	⇌	⇍	⇎	⇏	⇐	⇑	⇒	⇓	⇔	⇕	⇖	⇗	⇘	⇙	⇚	⇛	⇜	⇝	⇞	⇟	⇠	⇡	⇢	⇣	⇤	⇥	⇦	⇧	⇨	⇩	⇪	⇫	⇬	⇭	⇮	⇯	⇰	⇱	⇲	⇳	⇴	⇵	⇶	⇷	⇸	⇹	⇺	⇻	⇼	⇽	⇾	⇿	⤵	⤶	⤷	⤸	⤹	⤺	⤻	⤼	⤽	⤾	⤿	⥀	⥁	⥂	⥃	⥄	⥅	⥆	⥇	⥈	⥉	⥊	⥋	⥌	⥍	⥎	⥏	⥐	⥑	⥒	⥓	⥔	⥕	⥖	⥗	⥘	⥙	⥚	⥛	⥜	⥝	⥞	⥟	⥠	⥡	⥢	⥣	⥤	⥥	⥦	⥧	⥨	⥩	⥪	⥫	⥬	⥭	⥮	⥯	⥰	⥱	⥲	⥳	⥴	⥵	⥶	⥷	⥸	⥹	⥺	⥻	⥼	⥽	⥾	⥿	⦀	⦁	⦂	⦃	⦄	⦅	⦆	⦇	⦈	⦉	⦊	⦋	⦌	⦍	⦎	⦏	⦐	⦑	⦒	⦓	⦔	⦕	⦖	⦗	⦘	⦙	⦚	⦛	⦜	⦝	⦞	⦟	⦠	⦡	⦢	⦣	⦤	⦥	⦦	⦧	⦨	⦩	⦪	⦫	⦬	⦭	⦮	⦯	⦰	⦱	⦲	⦳	⦴	⦵	⦶	⦷	⦸	⦹	⦺	⦻	⦼	⦽	⦾	⦿	⧀	⧁	⧂	⧃	⧄	⧅	⧆	⧇	⧈	⧉	⧊	⧋	⧌	⧍	⧎	⧏	⧐	⧑	⧒	⧓	⧔	⧕	⧖	⧗	⧘	⧙	⧚	⧛	⧜	⧝	⧞	⧟	⧠	⧡	⧢	⧣	⧤	⧥	⧦	⧧	⧨	⧩	⧪	⧫	⧬	⧭	⧮	⧯	⧰	⧱	⧲	⧳	⧴	⧵	⧶	⧷	⧸	⧹	⧺	⧻	⧼	⧽	⧾	⧿	⨀	⨁	⨂	⨃	⨄	⨅	⨆	⨇	⨈	⨉	⨊	⨋	⨌	⨍	⨎	⨏	⨐	⨑	⨒	⨓	⨔	⨕	⨖	⨗	⨘	⨙	⨚	⨛	⨜	⨝	⨞	⨟	⨠	⨡	⨢	⨣	⨤	⨥	⨦	⨧	⨨	⨩	⨪	⨫	⨬	⨭	⨮	⨯	⨰	⨱	⨲	⨳	⨴	⨵	⨶	⨷	⨸	⨹	⨺	⨻	⨼	⨽	⨾	⨿	⩀	⩁	⩂	⩃	⩄	⩅	⩆	⩇	⩈	⩉	⩊	⩋	⩌	⩍	⩎	⩏	⩐	⩑	⩒	⩓	⩔	⩕	⩖	⩗	⩘	⩙	⩚	⩛	⩜	⩝	⩞	⩟	⩠	⩡	⩢	⩣	⩤	⩥	⩦	⩧	⩨	⩩	⩪	⩫	⩬	⩭	⩮	⩯	⩰	⩱	⩲	⩳	⩴	⩵	⩶	⩷	⩸	⩹	⩺	⩻	⩼	⩽	⩾	⩿	⪀	⪁	⪂	⪃	⪄	⪅	⪆	⪇	⪈	⪉	⪊	⪋	⪌	⪍	⪎	⪏	⪐	⪑	⪒	⪓	⪔	⪕	⪖	⪗	⪘	⪙	⪚	⪛	⪜	⪝	⪞	⪟	⪠	⪡	⪢	⪣	⪤	⪥	⪦	⪧	⪨	⪩	⪪	⪫	⪬	⪭	⪮	⪯	⪰	⪱	⪲	⪳	⪴	⪵	⪶	⪷	⪸	⪹	⪺	⪻	⪼	⪽	⪾	⪿	⫀	⫁	⫂	⫃	⫄	⫅	⫆	⫇	⫈	⫉	⫊	⫋	⫌	⫍	⫎	⫏	⫐	⫑	⫒	⫓	⫔	⫕	⫖	⫗	⫘	⫙	⫚	⫛	⫝̸	⫝	⫞	⫟	⫠	⫡	⫢	⫣	⫤	⫥	⫦	⫧	⫨	⫩	⫪	⫫	⫬	⫭	⫮	⫯	⫰	⫱	⫲	⫳	⫴	⫵	⫶	⫷	⫸	⫹	⫺	⫻	⫼	⫽	⫾	⫿	⬀	⬁	⬂	⬃	⬄	⬅	⬆	⬇	⬈	⬉	⬊	⬋	⬌	⬍	⬎	⬏	⬐	⬑	⬒	⬓	⬔	⬕	⬖	⬗	⬘	⬙	⬚	⬛	⬜	⬝	⬞	⬟	⬠	⬡	⬢	⬣	⬤	⬥	⬦	⬧	⬨	⬩	⬪	⬫	⬬	⬭	⬮	⬯	⬰	⬱	⬲	⬳	⬴	⬵	⬶	⬷	⬸	⬹	⬺	⬻	⬼	⬽	⬾	⬿	⭀	⭁	⭂	⭃	⭄	⭅	⭆	⭇	⭈	⭉	⭊	⭋	⭌	⭍	⭎	⭏	⭐	⭑	⭒	⭓	⭔	⭕	⭖	⭗	⭘	⭙	⭚	⭛	⭜	⭝	⭞	⭟	⭠	⭡	⭢	⭣	⭤	⭥	⭦	⭧	⭨	⭩	⭪	⭫	⭬	⭭	⭮	⭯	⭰	⭱	⭲	⭳	⭴	⭵	⭶	⭷	⭸	⭹	⭺	⭻	⭼	⭽	⭾	⭿	⮀	⮁	⮂	⮃	⮄	⮅	⮆	⮇	⮈	⮉	⮊	⮋	⮌	⮍	⮎	⮏	⮐	⮑	⮒	⮓	⮔	⮕	⮖	⮗	⮘	⮙	⮚	⮛	⮜	⮝	⮞	⮟	⮠	⮡	⮢	⮣	⮤	⮥	⮦	⮧	⮨	⮩	⮪	⮫	⮬	⮭	⮮	⮯	⮰	⮱	⮲	⮳	⮴	⮵	⮶	⮷	⮸	⮹	⮺	⮻	⮼	⮽	⮾	⮿	⯀	⯁	⯂	⯃	⯄	⯅	⯆	⯇	⯈	⯉	⯊	⯋	⯌	⯍	⯎	⯏	⯐	⯑	⯒	⯓	⯔	⯕	⯖	⯗	⯘	⯙	⯚	⯛	⯜	⯝	⯞	⯟	⯠	⯡	⯢	⯣	⯤	⯥	⯦	⯧	⯨	⯩	⯪	⯫	⯬	⯭	⯮	⯯	⯰	⯱	⯲	⯳	⯴	⯵	⯶	⯷	⯸	⯹	⯺	⯻	⯼	⯽	⯾	⯿	Ⰰ	Ⰱ	Ⰲ	Ⰳ	Ⰴ	Ⰵ	Ⰶ	Ⰷ	Ⰸ	Ⰹ	Ⰺ	Ⰻ	Ⰼ	Ⰽ	Ⰾ	Ⰿ	Ⱀ	Ⱁ	Ⱂ	Ⱃ	Ⱄ	Ⱅ	Ⱆ	Ⱇ	Ⱈ	Ⱉ	Ⱊ	Ⱋ	Ⱌ	Ⱍ	Ⱎ	Ⱏ	Ⱐ	Ⱑ	Ⱒ	Ⱓ	Ⱔ	Ⱕ	Ⱖ	Ⱗ	Ⱘ	Ⱙ	Ⱚ	Ⱛ	Ⱜ	Ⱝ	Ⱞ	Ⱟ	ⰰ	ⰱ	ⰲ	ⰳ	ⰴ	ⰵ	ⰶ	ⰷ	ⰸ	ⰹ	ⰺ	ⰻ	ⰼ	ⰽ	ⰾ	ⰿ	ⱀ	ⱁ	ⱂ	ⱃ	ⱄ	ⱅ	ⱆ	ⱇ	ⱈ	ⱉ	ⱊ	ⱋ	ⱌ	ⱍ	ⱎ	ⱏ	ⱐ	ⱑ	ⱒ	ⱓ	ⱔ	ⱕ	ⱖ	ⱗ	ⱘ	ⱙ	ⱚ	ⱛ	ⱜ	ⱝ	ⱞ	ⱟ	Ⱡ	ⱡ	Ɫ	Ᵽ	Ɽ	ⱥ	ⱦ	Ⱨ	ⱨ	Ⱪ	ⱪ	Ⱬ	ⱬ	Ɑ	Ɱ	Ɐ	Ɒ	ⱱ	Ⱳ	ⱳ	ⱴ	Ⱶ	ⱶ	ⱷ	ⱸ	ⱹ	ⱺ	ⱻ	ⱼ	ⱽ	Ȿ	Ɀ	Ⲁ	ⲁ	Ⲃ	ⲃ	Ⲅ	ⲅ	Ⲇ	ⲇ	Ⲉ	ⲉ	Ⲋ	ⲋ	Ⲍ	ⲍ	Ⲏ	ⲏ	Ⲑ	ⲑ	Ⲓ	ⲓ	Ⲕ	ⲕ	Ⲗ	ⲗ	Ⲙ	ⲙ	Ⲛ	ⲛ	Ⲝ	ⲝ	Ⲟ	ⲟ	Ⲡ	ⲡ	Ⲣ	ⲣ	Ⲥ	ⲥ	Ⲧ	ⲧ	Ⲩ	ⲩ	Ⲫ	ⲫ	Ⲭ	ⲭ	Ⲯ	ⲯ	Ⲱ	ⲱ	Ⲳ	ⲳ	Ⲵ	ⲵ	Ⲷ	ⲷ	Ⲹ	ⲹ	Ⲻ	ⲻ	Ⲽ	ⲽ	Ⲿ	ⲿ	Ⳁ	ⳁ	Ⳃ	ⳃ	Ⳅ	ⳅ	Ⳇ	ⳇ	Ⳉ	ⳉ	Ⳋ	ⳋ	Ⳍ	ⳍ	Ⳏ	ⳏ	Ⳑ	ⳑ	Ⳓ	ⳓ	Ⳕ	ⳕ	Ⳗ	ⳗ	Ⳙ	ⳙ	Ⳛ	ⳛ	Ⳝ	ⳝ	Ⳟ	ⳟ	Ⳡ	ⳡ	Ⳣ	ⳣ	ⳤ	⳥	⳦	⳧	⳨	⳩	⳪	Ⳬ	ⳬ	Ⳮ	ⳮ	⳯	⳰	⳱	Ⳳ	ⳳ	⳴	⳵	⳶	⳷	⳸	⳹	⳺	⳻	⳼	⳽	⳾	⳿	ⴀ	ⴁ	ⴂ	ⴃ	ⴄ	ⴅ	ⴆ	ⴇ	ⴈ	ⴉ	ⴊ	ⴋ	ⴌ	ⴍ	ⴎ	ⴏ	ⴐ	ⴑ	ⴒ	ⴓ	ⴔ	ⴕ	ⴖ	ⴗ	ⴘ	ⴙ	ⴚ	ⴛ	ⴜ	ⴝ	ⴞ	ⴟ	ⴠ	ⴡ	ⴢ	ⴣ	ⴤ	ⴥ	⴦	ⴧ	⴨	⴩	⴪	⴫	⴬	ⴭ	⴮	⴯	ⴰ	ⴱ	ⴲ	ⴳ	ⴴ	ⴵ	ⴶ	ⴷ	ⴸ	ⴹ	ⴺ	ⴻ	ⴼ	ⴽ	ⴾ	ⴿ	ⵀ	ⵁ	ⵂ	ⵃ	ⵄ	ⵅ	ⵆ	ⵇ	ⵈ	ⵉ	ⵊ	ⵋ	ⵌ	ⵍ	ⵎ	ⵏ	ⵐ	ⵑ	ⵒ	ⵓ	ⵔ	ⵕ	ⵖ	ⵗ	ⵘ	ⵙ	ⵚ	ⵛ	ⵜ	ⵝ	ⵞ	ⵟ	ⵠ	ⵡ	ⵢ	ⵣ	ⵤ	ⵥ	ⵦ	ⵧ	⵨	⵩	⵪	⵫	⵬	⵭	⵮	ⵯ	⵰	⵱	⵲	⵳	⵴	⵵	⵶	⵷	⵸	⵹	⵺	⵻	⵼	⵽	⵾	⵿	ⶀ	ⶁ	ⶂ	ⶃ	ⶄ	ⶅ	ⶆ	ⶇ	ⶈ	ⶉ	ⶊ	ⶋ	ⶌ	ⶍ	ⶎ	ⶏ	ⶐ	ⶑ	ⶒ	ⶓ	ⶔ	ⶕ	ⶖ	⶗	⶘	⶙	⶚	⶛	⶜	⶝	⶞	⶟	ⶠ	ⶡ	ⶢ	ⶣ	ⶤ	ⶥ	ⶦ	⶧	ⶨ	ⶩ	ⶪ	ⶫ	ⶬ	ⶭ	ⶮ	⶯	ⶰ	ⶱ	ⶲ	ⶳ	ⶴ	ⶵ	ⶶ	⶷	ⶸ	ⶹ	ⶺ	ⶻ	ⶼ	ⶽ	ⶾ	⶿	ⷀ	ⷁ	ⷂ	ⷃ	ⷄ	ⷅ	ⷆ	⷇	ⷈ	ⷉ	ⷊ	ⷋ	ⷌ	ⷍ	ⷎ	⷏	ⷐ	ⷑ	ⷒ	ⷓ	ⷔ	ⷕ	ⷖ	⷗	ⷘ	ⷙ	ⷚ	ⷛ	ⷜ	ⷝ	ⷞ	⷟	ⷠ	ⷡ	ⷢ	ⷣ	ⷤ	ⷥ	ⷦ	ⷧ	ⷨ	ⷩ	ⷪ	ⷫ	ⷬ	ⷭ	ⷮ	ⷯ	ⷰ	ⷱ	ⷲ	ⷳ	ⷴ	ⷵ	ⷶ	ⷷ	ⷸ	ⷹ	ⷺ	ⷻ	ⷼ	
---	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

Special symbols

UPGRADE TO NEW MICROSOFT WORD 6.0 FOR MS-DOS FOR \$99.

AND BECOME A MASTER OF MANIPULATION.

Take a few shortcuts and make your everyday tasks a whole lot easier. Just upgrade to new Microsoft® Word 6.0.

To start with, you can automatically add bullets to highlight key points. Or create a table with a single click on the new ribbon. Editing is a snap: use drag-and-drop editing to move text anywhere on the page. Then go back to the ribbon for one-step bold, italic, or underline formatting.

You can just as easily insert commonly used symbols like ©, ™, §, and ®. A few simple clicks and it's done. And with TrueType® fonts, the crisp text you see on your screen is the same text you'll get in your documents—on just about any printer.

Need more impact? Add lines, borders, and shading in one quick step. When all is said and done, run your work through the grammar checker to make sure it's all buttoned up.

With Word 6.0, you'll create polished and professional documents every time.

Right now you can upgrade to Microsoft Word 6.0 for MS-DOS® for \$99* and get a 90-day money-back guarantee.** Upgrade today. And see how Word 6.0 can help you become a master manipulator. So make the call.



To get a copy, see your local reseller.
For the name of a reseller near you,
or to order by phone, call
(800) 468-8899 and ask for Dept. JC8.

Microsoft®
Making it easier

Make your word processing easier with new drag-and-drop text editing, automatic bullets, lines and borders, one-step formatting ribbon, automatic tables, and special symbols.

REVIEWS / PRODUCT COMPARISON



16-bit 10Base-T workstation NICs

InfoWorld puts 13 network interface cards for clients through their paces

INTRODUCTION BY **PAUL FERRILL**
REVIEW BOARD

TEST DEVELOPMENT BY **TIM CRAWFORD**
AND **RODERICK CHAPIN**

TESTING BY **RODERICK CHAPIN**
AND **JEFF VAN CURA**

EDITED BY **CHERYL GOLDBERG**

With the popularity of networks on the rise, network interface cards (NICs) are getting increasing attention from the general computing public. In our April 19 issue (page 80), we tested 12 32-bit Ethernet 10Base-T NICs for use in servers. This time we look at 13 10Base-T workstation cards from Ansel Communications, Cabletron Systems Inc., CNet Technology Inc., D-Link Systems Inc., Eagle Technology, Hewlett-Packard Co., IBM, Intel Corp., NetWorth Inc., Racal-InterLan Inc., Standard Microsystems Corp., Thomas-Conrad Corp., and 3Com Corp.

In our June 28 issue, we will review 14 Token Ring cards from Accon Technology Corp., Andrew Corp., Cabletron, CNet, Eagle, IBM, Madge Networks Inc., NetWorth, Olicom USA Inc., Proteon Inc., Racal-InterLan, SMC, Thomas-Conrad, and 3Com.

THE MARKET. Ethernet currently claims the lion's share of the network topology market. Fifty-six percent of networked PCs use Ethernet, according to a study by International Data Corp., and the use of Ethernet is increasing faster than the growth of its chief competitor, Token Ring. The same survey shows 10Base-T (the standard for unshielded twisted-pair Ethernet used in combination with a central wiring hub) as the Ethernet wiring scheme of choice, and that's what we have reviewed.

Beyond network topology, your choice of NICs depends on price, performance, ease of installation, and support.

PERFORMANCE. The 16-bit ISA cards tested here all offered comparable performance: The Ethernet NICs varied by just 3 percent. Performance of the cards is close in part because the differences between the chip sets used to implement a NIC have shrunk as NICs have become a commodity. The other major contributor to performance, the software driver layer, is also becoming quite uniform because major vendors such as Intel have taken on the burden of writing high-performance drivers. Most NICs are compatible with drivers written either for the Eagle NE3200 or the SMC Elite. For the same reasons, workstation Ethernet

NICs are grouped closely in price.

INSTALLATION. Each NIC comes from the factory with default settings designed to avoid interfering with the most commonly used interrupts and I/O addresses for non-network devices. Unfortunately, systems equipped with a slew of other peripherals may end up in a conflict despite this practice.

Diagnostic utilities that reveal which interrupts and I/O address areas are being used (for example, QAPLUS, Win-Sleuth Gold, CheckIt Pro, PC Doctor, or even Manifest) can clarify the potential conflicts, but your job will be easier if your NICs can be configured for a wide range of interrupts and addresses. Be on the lookout for adapters that are configurable using software, eliminating the need to set large banks of jumpers and DIP switches.

FLEXIBILITY, EASE OF USE. You will want to make sure the card supports your network environment. The features tables in this comparison list the major operating systems each product supports. All of the cards support NetWare 2.x, 3.x, and 4.0 as well as LAN Manager, and with the right software loaded, the NICs can support several network protocols at one time. That's because almost all of the cards

tested included software based on one of two network driver specifications designed to support multiprotocol "stacks": Network Driver Interface Specification (NDIS) or Open Data-Link Interface (ODI). NDIS was devised by 3Com and Microsoft Corp. for the OS/2-based LAN Manager environment, and Novell Inc. released ODI with NetWare 3.0.

The approach Novell used before ODI involved use of the SHGEN utility to build an IPX.COM for each NIC. As a result, administrators often had the confusing and irritating job of supporting a number of IPX configurations. New IPX files had to be built to accommodate the release of a new IPX by Novell or updated driver files from a NIC vendor.

Going with ODI may make sense in a Novell environment, in large part because customization that had to be "hard-coded" into IPX.COM can now be handled by changing the text of a NET.CFG file. You can even use a single NET.CFG file for many different combinations of NIC drivers, protocols, and so on, because only the appropriate sections of NET.CFG are used by NetWare while others are ignored.

Paul Ferrill is an electrical engineer. Cheryl Goldberg is a former editor at PC Magazine.

16-bit Ethernet network interface cards differed mostly in price

Workstation network interface cards (NICs) serve as the interface from the client to the topology that connects to the server.

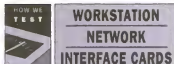
Our reader surveys told us to focus on the most common configuration: ISA bus architecture PCs. For this comparison, we chose to look at interface cards that conform to the 10Base-T topology.

We evaluated each group of cards in the comparison using our InfoMark benchmark tests, which use scripts to simulate users running Harvard Freehand Graphics, 1-2-3 for Windows, dBase IV, Word for Windows, and cc:Mail on a Novell network. The suite generates realistic network file and print traffic across the network to the file server.

HARDWARE CONFIGURATION:

To test the performance of workstation NICs as accurately as possible, we used high-performance components in the rest of the network to ensure it was the workstation NIC and not something else in the network that governed the throughput. Therefore, we used a Compaq Systropro 33-MHz 486 machine configured with 16MB of RAM, a 500MB integrated drive electronics (IDE) hard disk drive, and one Compaq NetFlex 32-bit ISA Ethernet NIC.

We attached five systems to the Systropro server: one Dell 25-MHz 486, one Dell 33-MHz 386, one Compaq 20-MHz 386SX, and two AST 286-12 Bravo systems. We connected each of these workstation systems and an additional AST 286-12 system to the administration to the hub/Multistation Access Unit (MAU) using unshielded twisted-pair (UTP) cabling. We used



Cabletron concentrators with the hub/MAU.

All of the clients and the hub/MAU connected to the server on the same segment or ring.

SOFTWARE CONFIGURATION:

We ran our InfoMark benchmark tests under Novell Inc.'s NetWare 3.11, installing the tests under a "master" server to ensure consistency across all the benchmark iterations. We used the default configuration for the server, with no optimizations. Each of the topologies ran at the default packet size as defined by NetWare.

SPEED:

We ran our test suite twice in two configurations—one client and five clients—and averaged the results. We compared the data and found a variance of less than 3 percent.

COMPATIBILITY:

In this category we tested how well each of the NICs worked in the range of clients in our test bed. Products that worked the first time without any problems received a high score. We lowered the score if we encountered any problems.

FLEXIBILITY:

To test flexibility, we noted the capability of each card to support a variety of network protocols and addressing schemes. A card that supported 10 or more settings received a score of excellent. Cards that supported

seven to nine settings received a very good; five to six a good; four a satisfactory; and three a poor score.

DOCUMENTATION:

The documentation should provide comprehensive technical information for the NIC and help you access this information quickly and easily.

We looked for extras such as illustrations, quick-start cards, and basic troubleshooting tips.

Comprehensive, well-organized, and well-written manuals received the highest scores. We lowered the score if the manual was poorly organized, lacked both a table of contents and index, did not include information on installing options, or if there were factual errors in the text.

SETUP:

In this category, we based our scores on how easy it was to install the software and device drivers.

The more automated the setup, the higher the score. We awarded the highest scores to cards that offered software setup routines that could automatically detect the interrupts and I/O settings in use on the card, and that came with pre-generated, auto-configuring Internetwork Packet Exchange drivers.

Cards with one of these automated features received a score of very good. We awarded a good score to cards that were mostly software configurable but had no auto-configuring features. Cards that required us to manually set numerous jumpers received satisfactory scores.

BOARD DESIGN:

To score this category, we examined the quality of the card's construction. We downgraded cards with patches or repairs and awarded higher scores for newer, more reliable production techniques,

such as surface-mount technology. The better the overall construction, the better the score.

SUPPORT POLICIES:

A one-year warranty covering parts and labor and unlimited (but not necessarily toll-free) technical support from the vendor earned a satisfactory score.

We awarded bonuses for unconditional money-back guarantees; on-site service included in the purchase price; extended support hours; bulletin board (e.g., CompuServe) support; and a toll-free number.

We subtracted points for no technical support, a limited support period, or dealer-only support.

TECHNICAL SUPPORT:

To score technical support, we made three anonymous support calls to the vendor for each product. Products that had available, knowledgeable technicians willing to offer extra help received the highest scores. For example, we awarded extra points if the technician volunteered to send us the latest drivers.

Technicians who lacked knowledge, a long time spent on hold, or waiting for calls back lowered the score.

PRICE:

We scored price mathematically. The lowest priced unit received the full possible points (200). All other systems received a percentage of the total points, which we calculated by dividing the lowest price by higher prices and multiplying by 200.

We used the list price only (street price will vary with the number of units you buy, your contract with your dealer, and other factors).

Executive summary

The 16-bit ISA 10Base-T workstation network interface cards we evaluated offered comparable performance. All completed our benchmark tests in times that varied by just 3 percent. Most were mid- or slot-length boards, which take up less slot space and are easier to install than full length boards; most were well constructed with modern surface-mount technology and no patches. The boards offered a great deal of flexibility in their I/O setting and interrupt support, and all were fully compatible with our test systems. Most offered excellent support policies, but Hewlett-Packard Co. offers support through dealers only.

The cards differed most in their installation procedures, documentation, price, and technical support.

The Intel EtherExpress FlashC LAN Adapter card, our highest scorer, stands out for its setup procedures. To install the card in a single machine on a local network, you run a software installation program that automatically configures the card and loads self-configuring Internetwork Packet Ex-

change (IPX) drivers. For larger networks, you can load drivers onto the server, then automatically download them to each workstation. Another utility lets you update drivers automatically from the server as necessary.

At \$99, CNet CN600E is priced considerably below any other card. However, with 22 jumpers and an 8-switch DIP switch, it was more difficult to set up than most of the other NICs except for Rascal-InterLan Inc.'s. In addition, it is the only card that lacked surface-mount technology.

Thomas-Conrad TC5143-T Ethernet Adapter garnered high scores in most categories, but it offered no automatic setup features. IBM LAN Adapter for Ethernet was the second lowest priced (\$155) but scored highly in most categories. SMC EtherCard Plus Elite16T offered superior compatibility, flexibility, board design, documentation, and support policies, but it is somewhat more expensive than the IBM and Thomas-Conrad cards. NetWorth UTP16B 10Base-T Interface Card is reasonably priced, offers excellent compatibility, flexibility, design, and support.

Engle NE2000 Plus 3 is a strong product, with excellent and very good scores in all categories, but it is more expensive (\$299) than some of the comparable



products. The HP 27247B PC LAN Adapter/16 TP Plus did well in design features and in price, but it received the lowest score for support policies because the product is supported only by HP dealers. 3Com EtherLink III 16/Bit Combo had the best performance, although its competitors were close behind, but it was more expensive.

Amstel NS2100-3 was priced reasonably but was more difficult to set up and had less elaborate documentation than other products. D-Link DE220CT, Cabletron E2110, and Rascal-InterLAN NCS10 were among the most expensive cards. Cabletron was the most expensive by far (\$395) but performed well.

“

No other program lets you create presentations so quickly and effortlessly, and none pays so much attention to guiding you through the process.”

PC Computing 12/92 MVP Award

“Remarkably easy to use...”

Windows Magazine 2/93

“Freelance Graphics for Windows is a joy to use and does an excellent job in all stages of developing a presentation...”

Window Sources 5/93

The first rule of any presentation is keep it simple. And it doesn't get any simpler than this.

Introducing Freelance Graphics for Windows, Release 2.0.

The first release of Freelance Graphics® won every major award in the presentation graphics category.

Now Lotus® enhances Release 2.0 with new features and improved usability that actually make the simple three-step process even simpler. In fact, it's now so fast, so friendly and so automatic, it's actually changing the way people use presentation graphics software.

Now people not only use Freelance Graphics to easily create beautiful last minute presentations, they use it to quickly generate handouts, even for informal meetings.

Let our SmartMasters be your guide.

Only Freelance Graphics has SmartMasters™ to automatically guide you through every step of the design process. You simply select the look you want, choose a page layout, and start filling in the blanks. It's that easy.

Just one click brings you a complete array of drawing, charting and editing tools, plus on-screen galleries for chart types, symbols, tables, and org. charts. You'll easily create professional quality output in overhead, slide, handout, and screen show formats. And a new toggle switch allows you to instantly view your presentation in



Creating a presentation of even (100 slides) is absurdly easy—and much easier, in many ways, than with competing products...

PC Week 2/15/93

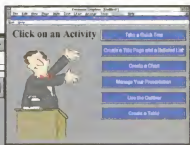
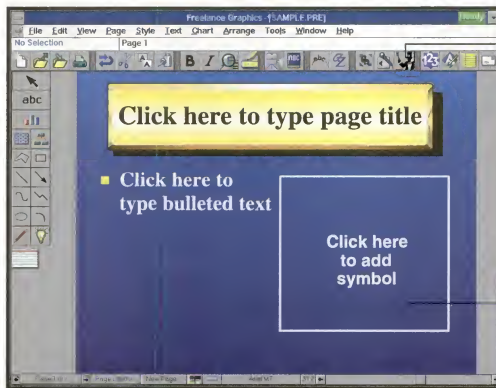
"There's bad news for the competition... Freelance Graphics for Windows 2.0 is even better than its predecessor. This program is about as straightforward and easy to use as they come."

PC World 1/93

"Inviting and even fun to use. More important, I produced a presentation in about an hour."

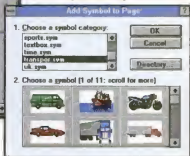
BYTE 2/93

99



Just click to view the animated QuickStart tutorial. It walks you through your first presentation in under 30 minutes.

Just click to browse through a gallery of over 500 editable symbols and maps. Or add your own.



Single-click access to powerful presentation tools makes Freelance Graphics easier to use than any other presentation graphics software.

black and white or color. Freelance automatically optimizes the design for printing either.

You'll be amazed at the beautiful results you immediately generate, without really trying. In fact, you couldn't look bad even if you tried.

Is the world's easiest presentation graphics software easy enough for you?

Call 1-800-872-3387, ext. 8928* to order your free, full-featured working model. You'll



see just how simple it can be.

While you've got us, ask about our special competitive upgrade price.

And for those just getting into Windows™, keep in mind that Freelance Graphics is also included in Lotus® SmartSuite™: four award-winning Lotus Windows applications at a very attractive price.

Lotus Freelance Graphics 2.0

Presentation Graphics for Windows

REPORT CARD

16-bit ISA Ethernet network interface cards

	(InfoWorld weighting)	Ansel NS2100-3	Cabletron E2110	CNet CN600E
Speed	(300)	265.2 minutes; 1 percent slower than 3Com. 295.93	268.2 minutes; 2 percent slower than 3Com. 292.62	266.2 minutes; 2 percent slower than 3Com. 294.82
Compatibility	(25)	Excellent (25)	Excellent (25)	Excellent (25)
Flexibility	(50)	Supports I/O addresses 399, 320, 340, 360; supports interrupts 5, 10, 11, 15. Very Good (37.50)	Supports I/O addresses 220, 280, 300, 380; supports interrupts 2, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15. Excellent (50)	Supports I/O addresses 200, 220, 240, 280, 2A0, 2C0, 300, 320, 340, 360; supports interrupts 2, 3, 4, 5, 7, 10, 11, 12, 14, 15. Excellent (50)
Documentation	(75)	Brief manual covers installation, configuration; includes a simple technical reference; numerous illustrations; manual covers several cards. Good (46.88)	Complete; a few plain diagrams; covers several products. Good (46.88)	Brief manual covers installation, cabling, troubleshooting, and specs; contains several illustrations. Very Good (56.25)
Setup	(150)	Software configurable; one jumper sets Boot PROM option; you must retrieve NE2100 drivers from Ansel's BBS; WSGEN uses NE2100 drivers to create IPX.COM, not auto-configuring. Good (93.75)	Mostly software configurable; one jumper configures I/O, another is for the Boot PROM (if installed); a pregenerated IPX.COM file self-configures for the card. Very Good (112.50)	Configurable via 22 jumpers and an eight-switch DIP switch; we needed to use the manual to set switches to configure the I/O address and optional Boot PROM memory address; other jumper settings were displayed on the board for easy configuration. Satisfactory (75)
Board design	(50)	Slot-length board; no patches; semi-surface mount; one jumper for Boot PROM option. Excellent (50)	Slot-length board; no patches; surface mount. Excellent (50)	Midlength; no patches; no surface-mount technology. Good (31.25)
Support policies	(50)	Five-year warranty; toll-free support 24 hours a day, seven days a week; BBS support. Excellent (50)	One-year warranty; toll-free support 8 a.m. to 8 p.m. Eastern time, weekdays; BBS support. Very Good (37.50)	Lifetime warranty; free support from 6 a.m. to 6 p.m. Pacific time, weekdays; BBS support. Very Good (37.50)
Technical support	(100)	Prompt callbacks; knowledgeable and patient. Very Good (75)	Reached technical support right away; helpful and patient. Very Good (75)	We got through quickly to courteous and knowledgeable technical support personnel. Very Good (75)
Price	(200)	\$179 for a bus-mastering Ethernet card with no RAM; sold through dealers. 110.61	\$395 with 16KB of on-board RAM. Sold direct. 50.13	\$99 with 16KB of on-board RAM; sold through dealers. 200
Final score		7.8	7.4	8.4

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.
Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.
Very Good = 0.75 — Meets all essential criteria and offers significant advantages.
Good = 0.625 — Meets essential criteria and includes some special features.
Satisfactory = 0.5 — Meets essential criteria.
Poor = 0.25 — Falls short in essential areas.
Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

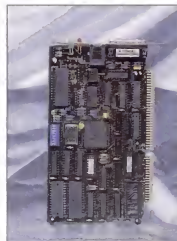
Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little.



Ansel Communications is located in San Jose, Calif., and can be reached at (800) 998-2675; (408) 452-5041; fax: (408) 435-0761.



Cabletron Systems Inc. is located in Rochester, N.H., and can be reached at (603) 332-9400; fax: (603) 332-4616.



CNet Technology Inc. is located in San Jose, Calif., and can be reached at (800) 486-2638; (408) 954-8000; fax: (408) 954-8866.

D-Link DE220CT

264.9 minutes; 1 percent slower than 3Com. **296.26**

Excellent (25)

Supports I/O addresses 240, 260, 300, and 320; supports interrupts 3, 4, 5, 9, 10, 11, and 15.

Excellent (50)

Thin manual; nice layout; good illustrations.

Good (46.88)

Software configurable; comes with a pre-generated IPX.COM file that self-configures for the card.

Very Good (112.50)

Slot-length board; no patches or jumper wires; semisurface mount.

Excellent (50)

Five-year warranty; free support 7 a.m. to 6 p.m. Pacific time, weekdays; BBS support. **Very Good (37.50)**

Always got right through; all calls answered quickly and with the correct information; friendly and willing to help.

Very Good (75)

\$245 with 16KB on-board RAM; sold through dealers.

80.82

7.7

Eagle NE2000 Plus 3

265.9 minutes; 2 percent slower than 3Com. **295.15**

Excellent (25)

Supports I/O addresses 240, 280, 200, 300, 320, 340, and 360; supports interrupts 3, 4, 5, 9, 10, 11, 12, and 15.

Excellent (50)

Provides in-depth information for setup and specifications for planning your network; refers you to NetWare documentation for software installation; well laid out; nice illustrations.

Very Good (56.25)

Software configurable; setup program tells you interrupt and I/O addresses already in use; comes with a pregenerated IPX.COM for default board settings, but not auto-configuring.

Very Good (112.50)

Slot-length board; no patches or jumper wires; semisurface mount.

Excellent (50)

Five-year warranty; toll-free support 7 a.m. to 4 p.m. Pacific time, weekdays; BBS support. **Excellent (50)**

Well-versed technical support solved each of our problems quickly.

Very Good (75)

\$229 with 16KB on-board RAM; sold through dealers.

86.46

8.0

HP 27247B PC LAN Adapter/16 TP Plus

265.0 minutes; 1 percent slower than 3Com. **296.15**

Excellent (25)

Supports I/O addresses 100, 120, 140, 160, 180, 1A0, 1C0, 200, 220, 240, 260, 280, 2A0, 2C0, 300, 320, 340, 360, 380, and 3A0; supports interrupts 3, 4, 5, 6, 7, 9, 10, 11, 12, and 15.

Excellent (50)

Thorough; well laid out; includes glossary; refers to READ.ME file for software installation; quick-reference card for installation and configuration.

Very Good (56.25)

Auto-configuring software setup; does not include a pregenerated IPX driver.

Very Good (112.50)

Midlength board; no patches or jumper wires; surface-mount technology; a metal shield over the RJ-45 connector reduces interference.

Excellent (50)

Lifetime warranty; free support through dealers. **Satisfactory (25)**

Only through dealers.

Satisfactory (50)

\$159 with 32KB on-board RAM; sold through dealers.

124.53

7.8

IBM LAN Adapter for Ethernet

266.9 minutes; 2 percent slower than 3Com. **294.04**

Excellent (25)

Supports I/O addresses 240, 280, 200, 300, 320, 340, and 360; supports interrupts 3, 4, 5, 7, 9, 10, and 11.

Excellent (50)

Brief manual covers installation and configuration; simple troubleshooting guide; few illustrations; undocumented jumper.

Good (46.88)

NE2000 compatible; software configurable with auto-configure option; setup program would not auto-detect on the AST 286 computers.

Very Good (112.50)

Midlength board; no patches or jumper wires; clean semisurface mount; one undocumented jumper.

Excellent (50)

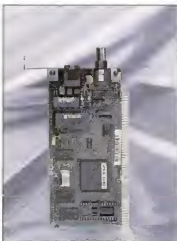
Five-year warranty; toll-free support 24 hours a day, seven days a week; BBS support. **Excellent (50)**

All calls were answered quickly and competently; the prescreening before we could talk to tech support was redundant, asking many of the same questions as tech support. **Good (62.50)**

\$155 with 16KB on-board RAM; sold direct and through dealers.

127.74

8.1



D-Link Systems Inc. is located in Irvine, Calif., and can be reached at (800) 326-1688 or (714) 455-1688; fax: (714) 455-2521.



Eagle Technology is located in San Jose, Calif., and can be reached at (800) 733-2453 or (408) 441-7453; fax: (408) 436-0348



Hewlett-Packard Co.'s Roseville network division is located in Roseville, Calif., and can be reached at (800) 752-0900; fax: (800) 333-1917.



IBM is located in White Plains, N.Y., and can be reached at (800) IBM-CALL; fax: (800) 426-2255.

CELEBRATE



REPORT CARD

16-bit ISA Ethernet network interface cards

		Intel EtherExpress FlashC LAN Adapter	NetWorth UTP 16B 10Base-T Interface Card	Racal-InterLan NI6510
	(InfoWorld weighting)			
Speed	(300)	266.8 minutes; 2 percent slower than 3Com. 294.15	266.7 minutes; 2 percent slower than 3Com. 294.26	272.3 minutes; 4 percent slower than 3Com. 288.21
Compatibility	(25)	Excellent (25)	Excellent (25)	Excellent (25)
Flexibility	(50)	I/O addresses supported: 200-270, 300-370; supports interrupts 2, 3, 4, 5, 10, and 11. Excellent (50)	Supports I/O addresses 240, 280, 200, 300, 320, 340, 360; supports interrupts 2 (9), 3, 4, 5, 10, 11, 12, 15. Excellent (50)	Supports I/O addresses 300, 320, 340, 360; supports interrupts 5, 9, 12, 15. Very Good (37.50)
Documentation	(75)	Complete; few illustrations; cramped layout; fold-out card available for installation and configuration; toll-free fax-back service. Very Good (56.25)	Detailed; good diagrams; no index. Good (46.88)	Easy-to-read, 50-page booklet; detailed installation instructions; numerous illustrations; does not explain driver configuration; good diagrams; pinouts and complete board specs; no index. Good (46.88)
Setup	(150)	Installation software allows you to load drivers onto the server then automatically download them to each adapter; another utility lets you update drivers as necessary; includes self-configuring software and pregenerated IPX drivers for installing in a single machine. Excellent (150)	NE2000 compatible; mostly software configurable, although one jumper resets configuration; setup program prevents you from choosing interrupt or I/O addresses already in use; WSGEN generates IPX.COM. Good (93.75)	Configurable via 18 jumpers and one switch for port selection; READ.ME file on the installation disk offered detailed driver configuration information; WSGEN generates IPX.COM. Satisfactory (75)
Board design	(50)	Slot-length board; no patches or jumpers; surface mount. Excellent (50)	Slot-length board; no patches or jumper wires; semisurface mount. Excellent (50)	Midlength board; no patches; semisurface mount. Excellent (50)
Support policies	(50)	Three-year warranty; free support weekdays from 7 a.m. to 5 p.m. Pacific time; BBS support. Very Good (37.50)	Three-year warranty; toll-free support weekdays from 8 a.m. to 6 p.m. Central time; BBS support. Excellent (50)	Lifetime warranty; toll-free support weekdays from 8 a.m. to 7 p.m. Eastern time; BBS support. Excellent (50)
Technical support	(100)	Answered questions completely and promptly; volunteered to send us the latest driver. Excellent (100)	Courteous and knowledgeable; technical support was able to explain problems and how to fix them. Very Good (75)	We were never put on hold; calls were returned promptly; courteous; questions answered accurately. Very Good (75)
Price	(200)	\$199 with 256KB on-board RAM; sold through dealers. 99.50	\$169 with 16KB on-board RAM; sold through dealers. 117.16	\$239 for bus-mastering card with no on-board RAM; sold through dealers. 82.85
Final score		8.6	8.0	7.3

GUIDE TO REPORT CARD SCORES

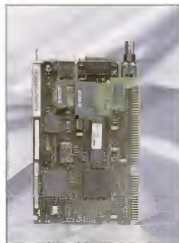
InfoWorld reviews only finished, production versions of products, never beta test versions.

Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

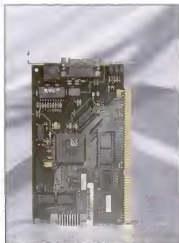
Excellent = 1.0 — Outstanding in all areas.
Very Good = 0.75 — Meets all essential criteria and offers significant advantages.
Good = 0.625 — Meets essential criteria and includes some special features.
Satisfactory = 0.5 — Meets essential criteria.
Poor = 0.25 — Falls short in essential areas.
Unacceptable or **N/A** = 0.0 — Falls to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little.

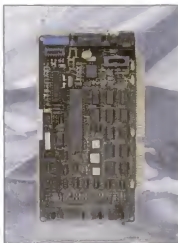
We now score speed and price for hardware products by a mathematical method. The fastest or least expensive product in each of those two categories receives the maximum points possible. All other units receive a percentage of the maximum points determined by dividing their results by the leader in the category. For example, a product that is twice as expensive as the lowest cost unit receives half the points.



Intel Corp. is located in Hillsboro, Ore., and can be reached at (800) 538-3373 or (503) 629-7402; fax: (800) 525-3019.



NetWorth Inc. is located in Irving, Texas, and can be reached at (800) 544-5255 or (214) 929-1700; fax: (214) 929-1720.



Racal-InterLan Inc. is located in Buxton, Mass., and can be reached at (800) LAN-TALK or (508) 263-9929; fax: (508) 635-9140.

SMC
EtherCard Plus
Elite16T


265.2 minutes; 1 percent slower than 3Com. **295.3**

Excellent (25)

Supports I/O addresses 200, 220, 240, 260, 280, 2A0, 2E0, 300, 230, 340, 360, 380, 3A0, 3C0, 3E0; supports interrupts 2, 3, 4, 5, 7, 10, 11, 15.

Excellent (50)

Comprehensive; includes configuration, troubleshooting, quick-start guides; extras include topology diagrams and cable specs.

Excellent (75)

Possible through software, or you can manually set five jumpers to configure; no pregenerated IPX drivers, but IPX.COM is auto-configuring.

Good (93.75)

Slot-length board; no patches or jumper wires; semisurface mount.

Excellent (50)

Five-year warranty; toll-free support weekdays from 8 a.m. to 9 p.m. Eastern time; BBS support. **Excellent (50)**

Answered correctly; were friendly and helpful but slow to return our calls.

Good (62.50)

\$199 with 16KB on-board RAM; sold through dealers.

99.50

8.0

Thomas-Conrad
TC5143-T
Ethernet Adapter


265.0 minutes; 1 percent slower than 3Com. **296.15**

Excellent (25)

Supports I/O addresses 240, 280, 2C0, 300, 320, 340, 360; supports interrupts 2, 3, 4, 5.

Excellent (50)

Clear and detailed; good illustrations; includes troubleshooting guide, table of contents; no glossary or index.

Very Good (56.25)

WSEN generates NE2000 driver; comes with two software setup utilities — one is menu driven and includes diagnostics, the other is a command line program and speeds setup; one "Ops" jumper resets configuration, one jumper is for Boot PROM.

Good (93.75)

Slot-length board; no patches or jumper wires; semisurface mount; very few components.

Excellent (50)

Five-year warranty; toll-free support seven days a week, 24 hours a day; BBS support. **Excellent (50)**

Friendly, helpful, knowledgeable.

Very Good (75)

\$159 with 16KB on-board RAM; sold through dealers.

124.53

8.2

3Com
EtherLink III
16/bit Combo


261.6 minutes; fastest Ethernet card. **300**

Excellent (25)

Supports I/O addresses 200-3E0. Supports interrupts 3, 5, 7, 9, 10, 11, 12, 15.

Excellent (50)

Thorough; helpful diagrams; table of contents, index, glossary; Rolodex card with support numbers, warranty fulfillment, etc.; documentation is combined for several models; nice layout.

Very Good (56.25)

No pregenerated IPX driver, but it is auto-configuring; a menu program steps you through driver installation and board setup.

Good (93.75)

Slot-length board; no patches, single integrated chip set; semisurface mount.

Excellent (50)

Lifetime warranty; toll-free support weekdays from 6 a.m. to 6 p.m. Pacific time; BBS support. **Excellent (50)**

Knowledgeable; answered all of our questions correctly.

Very Good (75)

\$225 with 4KB on-board RAM; sold through dealers.

88

7.8



Ansel's hub has adapter built in

Ansel Communications' 2104 4 Port Internal Hub with Built-In Adapter is a unique solution for networking small workgroups. The product combines a standard 16-bit Ethernet adapter card with a four-port hub. The four-port hub, mounted right on the card, provides a 10Base-T connection to any four nodes on the network as well as a 10Base-2 BNC connection, giving the card a total of five connections.

Ansel's connection scheme gives the card simultaneous dual media capability. Thus, if your network contains both 10Base-T and 10Base-2, the card can connect to both without the need for a second card in the server. If you use this card in the server, you may, for example, want to use the four UTP ports for various dedicated stations — such as a print server, fax/modem pool, or tape backup unit — and the BNC connector for the main cabling within the network. Similarly, you could use the card in a workstation to connect other nodes right to the back of the workstation.

The board is bus mastering and compatible with Novell Inc.'s NE2100. It is software configurable for easy setup and offers an optional plug-in module that allows the card to support an additional four ports.

The 2104 works with most major networks and retails for \$399. Ansel Communications is headquartered in San Jose, Calif., and can be reached at (800) 998-2675.

— Rod Chapin

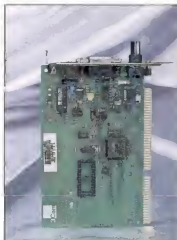
Computerworld magazine



Standard Microsystems Corp. is located in Hauppauge, N.Y., and can be reached at (800) SMC-4-YOU or (516) 435-6394; fax: (516) 273-1803.



Thomas-Conrad Corp. is located in Austin, Texas, and can be reached at (800) 332-8683 or (512) 836-1935; fax: (512) 836-2840.



3Com Corp. is located in Santa Clara, Calif., and can be reached at (800) NET-3COM or (408) 764-5000.

**SURE, ALL SPREADSHEETS
ARE PRETTY MUCH THE SAME.
AND THIS IS JUST A STICK.**



In this my-feature-is-better-than-your-feature world of spreadsheets, one could be convinced there's not an appreciable difference among them.

But, as with any tool, there's always one that's best. One that emerges as the standard by which others are measured.

In the competitive world of spreadsheets, that one is Microsoft® Excel for Windows.™

How do we do it?

We study how people use their spreadsheets. What tasks they do every day. We track their every keystroke. And we ask questions.

Simply explained, we watch. We listen. And we think.

Through this painstaking process, we've been able to develop a spreadsheet that makes it easier to do the things people do most often.

For instance, we automated common processes, like adding totals on worksheets. Now all it takes is a click on the Autosum™ icon.

We invented new features like Autoformat and Autofill to greatly simplify the mundane things you have to do. Like filling in trend data

and formatting spreadsheets.

And we developed a way to instantly make eye-popping charts and graphs, even if you've never made them before. We named it, appropriately, ChartWizard.

But we were just getting started.

We tested our improvements. In the field. And in the lab. With experts. As well as with inexperienced spreadsheet users.

To date, we've invested over 400 cumulative years of development and testing to create something truly remarkable: a spreadsheet that actually works the way you do.

Which brings us to our final point, for which we'll refer to that unassuming piece of wood on the other page.

Maybe the Babe could have hit a home run with a rolled-up newspaper. Still, he used the tool that was best for the job. At the risk of sounding presumptuous, don't you think you should too?



Microsoft Excel is available separately or as a part of The Microsoft Office.

Microsoft
Making it easier

BENCHMARKS

INFO
WORLD

Ethernet cards

	Ansel NS 2100-3	Cabletron E2110	CNet CN600E	D-Link DE220CT	Eagle NE2000 Plus 3	HP 27247B PC LAN Adapter/16 TP Plus	IBM LAN Adapter for Ethernet	Intel EtherExpress FlashC LAN Adapter	Networth UTP16B 10Base-T Interface Card	Racal InterLAN N6510	SMC EtherCard Plus Elite16T	Thomas-Conrad TC5143-T Ethernet Adapter	3Com EtherLink II 16/Bit Combo
Five workstations ¹	265.2	268.2	266.2	264.9	265.9	265	266.9	266.8	266.7	272.3	265.2	265	261.6
One workstation ²	38.6	39.5	39.3	38.9	39.3	39	39.3	39.5	39.3	42.2	39	39.1	37.9

Times in minutes

Lower numbers indicate better performance.

¹ Report card speed score based on total time for five stations. Workstations were one Dell 25-MHz 486SX, one 33-MHz Dell 386DX, one Compaq 20-MHz 386SX, and two AST 286/12 Bravos.² Dell 25-MHz 486SX.

FEATURES

INFO
WORLD

Ethernet cards

	Ansel NS 2100-3	Cabletron E2110	CNet CN600E	D-Link DE220CT	Eagle NE2000 Plus 3	HP 27247B PC LAN Adapter/16 TP Plus	IBM LAN Adapter for Ethernet	Intel EtherExpress FlashC LAN Adapter	Networth UTP16B 10Base-T Interface Card	Racal InterLAN N6510	SMC EtherCard Plus Elite16T	Thomas-Conrad TC5143-T Ethernet Adapter	3Com EtherLink II 16/Bit Combo
Chip set	AMD PCNET ISA AM79C960/C	National Semiconductor DP83902	CNet proprietary	D-Link proprietary	National Semiconductor ATLANTIC	HP proprietary	National Semiconductor ATLANTIC	Intel 82586	National Semiconductor ATLANTIC	AMD	SMC proprietary	National Semiconductor ATLANTIC	3Com proprietary
Media types	BNC, AUI, RJ-45	AUI, RJ-45	AUI, RJ-45	BNC, RJ-45	BNC, AUI, RJ-45	AUI, RJ-45	RJ-45, AUI, BNC	BNC, AUI, RJ-45	AUI, RJ-45	AUI, RJ-45	AUI, RJ-45	RJ-45	BNC, AUI, RJ-45
Options	Boot PROM	64K RAM, Boot PROM	Boot PROM	Boot PROM	Boot PROM	Boot PROM	None	None	Boot PROM	Boot PROM	Boot PROM	Boot PROM	Boot PROM
IO addresses	300, 320, 340, 360	220, 280, 300, 380	200, 220, 240, 260, 280, 300, 320	240, 260, 280, 300, 320	240, 280, 300, 320, 340, 360	100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340	240, 280, 300, 320, 340, 360	200-270, 300-370	240, 280, 300, 320, 340, 360	300, 320, 340, 360	200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400, 420	240, 280, 300, 320, 340, 360	200, 300
Interrupts	5, 10, 11, 15	3, 4, 5, 7, 9, 10, 11, 12, 14, 15	2, 3, 4, 5, 7, 10, 11, 12, 14, 15	3, 4, 5, 7, 10, 11, 12, 14, 15	3, 4, 5, 9, 10, 11, 12, 15	3, 4, 5, 6, 7, 9, 10, 11, 12, 15	3, 4, 5, 7, 9, 10, 11	2(9), 3, 4, 5, 10, 11	2, 3, 4, 5, 10, 11, 12, 15	5, 9, 12, 15	2, 3, 4, 5, 7, 10, 11, 15	2, 3, 4, 5	3, 5, 7, 9, 10, 11, 12, 15
Status LEDs	Link, Activity	Link, Activity, tx, rx	Link, Activity	Link, Jabber, Collision, Power	Link, Polarity	tx, rx, Link Beat, Port Selected	Link, Activity	Link, Activity	Link, tx, rx, Collision, Polarity, Cable type	Link	Transmit, Receive, Polarity, Link	tx, rx, Collision, Link	None
SNMP compatible	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Bus mastering	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No
Networks supported	NetWare 2.x, 3.x, 4.0, LAN Manager, Windows for Workgroups, IBM LAN Server, DEC Pathworks, Banyan Vines	NetWare 2.x, 3.x, 4.0, LAN Manager, IBM LAN Server, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix	NetWare 2.x, 3.x, 4.0, LAN Manager, LAN Manager, FTP PC/TCP, Sun PC NFS, Xenix

COPY SOFTWARE ILLEGALLY AND YOU COULD GET THIS HARDWARE ABSOLUTELY FREE.



Software piracy isn't just a crime. It's a shame. Because most people who do it aren't even aware that it's illegal. If you copy software that's protected by copyright, you could lose your job, face a civil suit, pay a \$100,000 fine and possibly be imprisoned. So get the facts now. To request more information, contact the Software Publishers Association at 1-800-388-7478. Because in a court of law, ignorance is one thing you won't be able to plead.

Please send me more information on the legal use of software.

Name _____		
Organization _____		
Title _____		
Address _____		
City _____ State _____ Zip _____		
Please check software format you prefer if you would like to receive SPRA's software inventory management tool.		
DOS 5.0 _____ DOS 5.0* _____ Macintosh*		
Mail to: Nancy Updean, 1730 M Street, N.W., Suite 700, Washington, D.C. 20036-6119		
		V-1

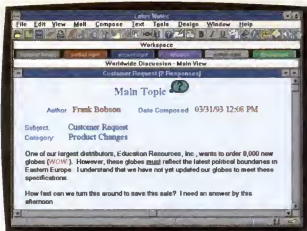


Don't Copy That Floppy

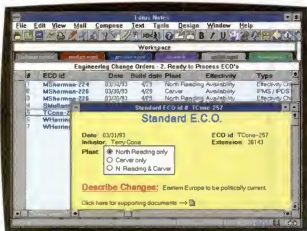
Macintosh is a registered trademark of Apple Computer, Inc.



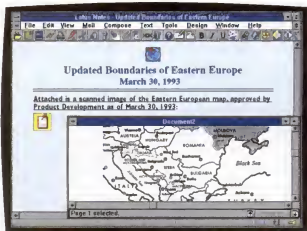
1. This is James' Notes desktop. He uses it to access information and work quickly with people in all departments to solve problems worldwide. James clicks on the Worldwide Discussion application to catch up with important company news. The SmartIcons across the top make it even easier to work in Notes.



2. The field rep in Texas is working on a request from a customer. But to make the sale the product, in this case a globe, has to be changed to reflect the most up-to-date countries and borders. And evidently time is critical. The competition must already be in there pitching.



5. Once he has the information, he clicks on the Engineering Change Order application to request specific product changes from the plant in North Reading. He links the supporting Newswire information to the E.C.O. It will be easily viewed with a single click of a button.



6. After lunch he opens a document from Ellen in product development, who has responded with the necessary changes, and scheduling information. The new art was scanned directly through Lotus Notes Document Imaging from the art department. James approves the art for manufacturing.

How Lotus Notes Release

Thousands of companies already know how Lotus Notes® helps them respond more quickly and effectively to the demands of everyday business. Now Release 3 extends that power to new dimensions.

Just watch how James Carlton, a new district manager at Global Publishing, uses Notes Release 3 to solve a major global problem in short order. See how he uses information from on-site and remote locations. From both inside the company and external sources. Across a



variety of platforms. How he uses applications such as Account Tracking, Newswire, and Engineering Change Orders to get a new product developed fast. And how he creates an informal team spanning a range of departments to do it.

With the new Release 3, Lotus Notes now supports all the leading GUI platforms: Windows, OS/2, UNIX,* even Macintosh.*

Which means the award-winning workgroup power of Lotus Notes is now readily available to help virtually all networked businesses improve

Silicon Ecology



It's Tax-Deductible

Instead of thinking of your company's used PCs, printers, modems, and other computer products as *used up*, consider them *reusable*. That's Silicon Ecology, and it makes sense all the way around.

The East West Foundation takes your surplus equipment and distributes it to American schools and colleges and to democratic and educational institutions in Eastern Europe, the Commonwealth of Independent States, and Latin America—wherever it can make a difference. And it *does* make a difference.

Donating used or overstock computer equipment to the East West Foundation can make a difference to you, too—at the bottom line. Because all donations are tax-deductible.

To find out more about Silicon Ecology or arrange for a donation, please call:

East West Foundation
49 Temple Place, Boston, MA 02111
(617) 542-1234 Fax (617) 542-3333
A Not-For-Profit Corporation



REVIEWS

Norton Utilities 7 takes lead by small margin

Upgrade accommodates more powerful systems and added features for MS-DOS 6.0

By TOM BILEY REVIEW BOARD

In the decade since early versions of Norton Utilities began to show up in PC gurus' tool boxes, this has become a must-have program for nearly every serious computer user.

Largely an evolutionary upgrade for MS-DOS 6.0 and today's high-powered hardware configurations, Norton Utilities 7.0 includes a slew of new features and improvements. There are more than 30 separate utilities, most of which perform a multitude of functions, and all of which are tightly integrated through Norton's main menu and by their common appearance and operating procedures. Nearly every one of the program's tools can make your computing faster, safer, and easier; and several of the utilities can save your proverbial life when that inevitable disaster strikes.

Symantec has made Version 7.0 a worthwhile addition to your collection, even if you are still running DOS 3.3 on your trusty old AT machine.

We evaluated Norton Utilities 7.0 using

the same scoring criteria from the last time we reviewed Version 6.0 (see review, July 15, 1991, page 75).

FEATURES:

Norton Utilities 7.0 consists of two brand-new utilities and upgrades of the old favorites for today's operating environments. However, you will not find the calendars, calculators, and other gadgets that are part of such competing packages as Central Point's PC Tools (see review, November 16, 1992, page 136). What you will find in Version 7.0 is a collection of top-notch utilities firmly dedicated to three basic goals: data protection and recovery, performance optimization, and productivity enhancement.

The two newcomers to Norton Utilities are Norton Diagnostics (NDIAGS), an impressive new hardware diagnostic tool that thoroughly checks every aspect of your system, and Duplicate Disk (DUPDISK), a welcome replacement for DOS' DISKCOPY, which will copy your disks in a single pass and make multiple copies without rereading the original.

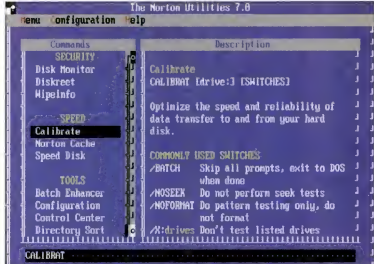
Almost all of the existing utilities feature enhancements that you have large hard drives (up to 2 gigabytes), Norton Utilities 7.0 can handle them, if you provide enough extended or expanded memory. If you use DOS 6.0's DoubleSpace, Star Electronics' Stacker 2.0 or 3.0, or AddSoft's SuperStor or SuperStor Pro compression programs, Version 7.0 utilities, including Speed Disk (SPEEDISK), Disk Doctor, and Norton Cache (NCAACHE), can handle them all.

DISKEDIT, Norton's powerful system editor, boasts a new feature called Advanced Recovery Mode (ARM). ARM makes it possible for DISKEDIT to recover data from hard drives even after they have suffered physical damage. Symantec has improved FILEFIX, which can now repair data files from Excel 3.0 and 4.0, all versions of Lotus 1-2-3 through 3.x, Quattro Pro, WordPerfect 5.x, and dBase III and IV files. FILEFIND now includes a Search-and-Replace function that lets you search for and replace text strings across your drives. NDOS, Norton's version of the 4DOS replacement for COMMAND.COM, offers a variety of enhancements, including improved copy, delete and move functions; extended wild-card support; and a new partition configuration; and the capability to color-code directory listings.

We were disappointed that Symantec still has not closed its ring of data protection by including a backup utility. Although DOS 6.0 provides a limited edition of Norton 360DX/25 with a Cyt tape backup and other features users of Norton Utilities are likely to need.

PERFORMANCE:

We tested Norton Utilities 7.0 on four different PCs. Our primary test machine was a Gateway 2X86/25 with a Cyt 486/25 CPU upgrade and an Intel 80387 math coprocessor. To verify our results, we performed some supplemental test-



Given the depth and breadth of Norton Utilities 7.0, Symantec provides several on-line help options, such as the main menu Help option for detailed information.

ing on a Data General Walkabout 386SX/16 laptop, a Compaq Deskpro/M 486DX/26 EISA, and a Gateway 2000 486DX/33. All the machines ran DOS 6.0, except the Gateway 486DX/33, which ran DOS 5.0. The three desktop units had 16MB of RAM, and the Data General laptop had 8MB of memory. The Gateway 2000 386/25's two 210MB integrated drive electronics (IDE) drives, and Data General's 40MB IDE drive were compressed with DOS 6.0's DoubleSpace.

If you've been using Norton Utilities 6.0, you will feel instantly comfortable with Version 7.0: the look and feel are identical. You will find the same familiar screen layouts, complete with menu bar across the top, pull-down menus, pop-up windows, and full mouse support in all the utilities with an interactive mode. You can launch any of the utilities either from the DOS prompt or Norton's main menu utility, which prompts you with its context-sensitive information window that displays the selected utility's function, command-line syntax, and common command-line switches.

We used all the tools in Version 7.0 at least once, watching for any problems with performance, operation, or feel that might logically occur in a new release.

We found, for the most part, the reliable, trouble-free performance we expect from a program that's been a long-standing industry leader. We did run into a couple of glitches. The new NDIAGS diagnostic utility caused our Gateway 386/25 to reboot almost as soon as the tool began to load. NDIAGS also caused our Gateway 486/33 to frequently lock up while determining the system setup. We finally found a NOKBTYPE command-line switch that fixed our problems with the Gateway machines, enabling NDIAGS to run properly.

In addition, when NDIAGS set up to run

the comprehensive system memory test, it reconfigured our system with its own start-up files and then rebooted, running itself as the command shell during the testing, then resetting our system to its original configuration when we exited. Unfortunately, Version 7.0 doesn't add the ability to skip its start-up tests, so our Gateway 486 reverted to its previous behavior, and our Gateway 386 went into a continuous load-and-reboot loop. We rebooted from disks, manually added the switch to NDIAGS' start-up file, and finally got the memory tests running. (Note: you'll want to run this test overnight; it took more than 9 hours on the Gateway 386.)

Our second problem arose when we attempted to run SPEEDISK on our Compaq 486DX/26, with its 510MB SCSI hard disk that was more than 85 percent full. SPEEDISK barely got going, only making it to cluster 122, when it stopped and reported that, despite the Compaq's 16MB of RAM, the program was out of memory. This makes us question Symantec's claim that SPEEDISK can support up to 2-gigabyte drives. We had to boot up with a bare-bones configuration to give SPEEDISK enough memory to handle our hard drive. (We found no reference to this limitation in the documentation.) According to the vendor, although Norton Utilities 7.0 can support 2-gigabyte drives, it needs as much conventional memory as possible to get started.

We were impressed with some of NDOS' new features, particularly the wild-card option that lets you define a group of characters in your filter. For example, the wild-card file specification "[A][B]*" will select only those files with an "A," "B," or "C" as the second character. We were dressed up our directory listings by color-coding the subdirectories and .COM, .EXE, and batch files.

Lacking a suitably damaged hard

REPORT CARD INFO WORLD

UTILITY SOFTWARE Norton Utilities

Version 7.0



Criterion	(Weighting)	Score
Performance	(400)	Very Good
Documentation	(400)	Very Good
Ease of learning	(400)	Excellent
Ease of use	(120)	Excellent
Error handling	(80)	Very Good
Support		
Support policies	(40)	Very Good
Technical support	(400)	Satisfactory
Value	(200)	Excellent
Final score		8.3

PRODUCT SUMMARY

Company: Symantec Corp., in Cupertino, Calif., can be reached at (800) 441-7234 or (408) 252-3510.

List price: \$119. Registered owner of previous versions can upgrade for \$49; \$99 if purchased with MS DOS 6.0.

Requires: Intel 80286 or compatible; DOS 3.3 or later; 640K off RAM (1MB recommended); hard disk with 6MB free disk space.

Price: Powerful; easy to use.

Cons: No backup utility.

Summary: Norton Utilities 7.0 is a must-have collection of top-of-the-line tools designed to protect your data and improve system performance in today's MS-DOS 6.0 and high-powered hardware environment.

Dual Scan Color!



New!

Northgate® Brings You Fast, Brilliant Color For Only \$2499!

Now there's a color notebook that bridges the gap between passive and active matrix color. Presenting the new Northgate ZXPortable 486 with dual scan color.

This revolutionary system features a fast color display that appears twice as bright as most passive color displays. And, best of all it's available at an incredibly-low price!

In the ZXPortable tradition, this performer is available with your choice of 486SX/25 or 486DX/25 power and comes with everything you need for on-the-go computing – even a trackball mouse and durable fabric carrying case.

Plus, order now and we'll also send you PackRat software. This critically-acclaimed PIM/contact management software has a value of \$395...but it's yours, FREE. Call now!

ZXPortable Dual Scan Color

- Intel® 486SX/25MHz processor; 486DX/25 available
- 120MB hard drive; 200MB available
- 4MB RAM; expands to 16MB
- Dual Scan Color display with 640 x 480 resolution, 256 colors and 512K video memory
- 86-key full-travel keyboard with inverted "T" cursor control
- Nickel metal-hydride battery provides up to 2 hours of power with Power Management enabled
- True 8.5" x 11" size; 6.4 lbs.
- MS-DOS 6.0 and Windows™ 3.1
- Logitech TrackMan Portable mouse
- Fabric carrying case
- Free \$395.00 value PackRat contact/personal information manager software

\$2499

(Lease As Low As \$85.66/month*)

System includes:

- Toll-free technical support 24 hours a day/7 days a week
- One-year warranty on system parts and labor
- 30-day money back guarantee

**Call For More Information
800-453-0183**

GA #GS00K91AGS8193 PS01

Major credit cards,
money orders,
direct wire and
approved company
purchase orders accepted.



NORTHGATE®

Solutions for Workgroups™

7075 Flying Cloud Drive, Eden Prairie, MN 55544

drive, we were unable to check out DISKEDIT's new AFM feature, which should let you recover some data even though DOS doesn't recognize the drive. However, everything else worked fine.

The only real surprise we received while we worked our way through Version 7.0's utilities was the dramatic impact data compression had on SPEEDISK's operating times. Before we compressed the 90-percent-full 210MB hard drive on our Gateway 25-MHz 386, complete optimization with read-verify took just less than 5 minutes. After we used DoubleSpace to compress the drive, the program reported less than 60 percent filled capacity but required more than 2 hours and 15 minutes for the same level of optimization. We ran SPEEDISK again after just enough activity to leave a few holes in our optimized files, and the utility again required more than 2 hours. Our Data General laptop yielded similar results. When we ran SPEEDISK on our uncompressed drives, completion times fell in our previous range of a few minutes.

Part of this time increase is due to the fact that SPEEDISK performs two complete optimizations. First it optimizes the "phantom" drive that holds the compressed volume, then SPEEDISK optimizes the actual compressed volume. Although the first operation is fairly quick, comparable to times of uncompressed drives, the second pass slows things down.

According to the vendor, these findings are an inescapable result of Microsoft's DoubleSpace compression scheme and the sophisticated procedures necessary to safely optimize its volumes. Symantec claims substantial speed advantages over the optimization utilities provided by third-party compression software, although we were not able to confirm that. In addition, the faster times achieved by DBLSPACE/DEFRAGMENT are a result of packing all the data to the front of the compressed volume without actually defragmenting or sorting individual files, as SPEEDISK does.

We also noticed a time degradation in Disk Doctor's surface tests on compressed disks, but only on the order of 20 to 30 percent.

We launched each utility from Norton's main menu and the DOS prompt without a hitch. Although we liked the command-line help available at the DOS prompt, we frequently loaded Norton's main menu for its information window, which jogged our memories as to which utilities handled our desired functions.

Aside from the couple of incidents we encountered, Norton Utilities 7.0 ran smoothly and solidly, which is quite an accomplishment given the breadth and technical nature of this program. Performance earns a very good score.

DOCUMENTATION:

Symantec's reputation for providing top-notch documentation stands untarnished with this release of Norton Utilities. Symantec has condensed Version 7.0's hard copy documentation to a single manual, including a fold-out emergency data recovery guide and various order forms. Unfortunately, Symantec replaced much of the printed documentation with text files on the program disks, of which there are six. The NDOS manual, for example, is almost 1MB in size, and if you plan on using this manual, you will have to print out all 350 pages. You can do a text search on this disk to find what you're looking for so you don't have to print out the entire disk. But Symantec will offer a hard copy version of the NDOS

manual for \$9.95.

The documentation proved well written, informative, and easy to understand. In addition to chapters on each utility, the manual includes Installation and Getting Started sections and several tutorials. There's also an appendix that includes such information as troubleshooting. A complete table of contents and extensive index make it easy to find information you need (except in the case of our out-of-memory SPEEDISK problem).

Symantec provides several on-line help options. Each interactive utility has its

own context-sensitive help available via the F1 key. You can also use the main menu Help option for more detailed help or to access Norton's Adviser, a collection of solutions and fixes for more than 100 common problems in DOS and various popular applications. If you run the utilities from your DOS prompt, adding a "/?" switch displays command-line syntax help for the specified command. Documentation earns a very good score.

EASE OF LEARNING:

Surprisingly, there's not much you have

to learn to use most of the tools in Norton Utilities 7.0. Many run automatically after you launch them and respond to a prompt or two. Several utilities, such as UNERASE and FILEFIX, offer both automatic and manual modes. If you opt to work in their manual mode, you will probably want to do it with manual in hand, moving step-by-step through each operation. Although you shouldn't have to learn these utilities to use them in the manual mode, you will need to understand something about file structures.

Before you use DISKEDIT, you might

Any font, any size, any color.

COMING JUNE 28.

MILLIONS OF NEW MS-DOS 6
USERS ARE SATISFIED.

MS
DOS

Package contains 5 25" high-density disks
and a coupon for low-density disks.

The
easy way to
double your
disk



Microsoft
MS-DOS 6
Operating System

UPGRADE

WE'RE NOT.



"We think this is our best MS-DOS ever. But I want to know what you think."
Brad Chase, General Manager of MS-DOS

You've helped us make the MS-DOS® 6 Upgrade the biggest software launch in history. For that, we thank you. With over 3 million copies shipped, we're thrilled so many of you are already happily using it.

We've gotten great feedback that more than 90% of you are satisfied. That's very good news to us.

William Gibson, National Support Engineer, General Electric Medical Systems, told us, "With the integrated disk compression, I get a lot more space. I'm more comfortable with something I know works, and works every time."

And publications like *PC Week*, *PC/Computing*, *ComputerWorld*, *PC World*, *Corporate Computing*, and *PC Magazine* have all given the MS-DOS 6 Upgrade good reviews.

"It delivers enormous practical benefits and is by far the most compelling MS-DOS Upgrade yet," says Jon Udell of *BYTE* (4/93).

So the MS-DOS 6 Upgrade is proving to be a safe, smart, easy-to-use operating system including integrated disk compression.

Although 90% customer satisfac-

tion is very high, it does leave room for improvement. Despite the fact that MS-DOS 6 has received the lowest percentage of support requests among our top 10 products, the overwhelming customer response caught us a bit off guard. And we weren't able to answer the phones fast enough.

That's why we're now adding even more specialists to reach our goal of answering every call in less than a minute (our usual standard). Our whole MS-DOS team is pitching in to help.

So if you need us, please call us or hook up on CompuServe®. You can also call us at (206) 646-5103 and we'll fax you our FastTips. You can even write Brad Chase, our MS-DOS General Manager, personally if you like.

We'll be here listening to your concerns and coming up with solutions. Because we won't feel 100% satisfied until you do.

Microsoft
Making it easier

want to spend some time running it in its default read-only mode while you explore and learn about your system. Although DISKEDIT is easy to learn and use, you will be courting major disaster if you start editing things before you know exactly what you're doing.

If you are a proficient DOS user, you can use NDOs right out of the box. It is fully compatible with standard DOS commands, and everything you know about DOS will work the same under NDOs. However, once you delve into the utility's array of additional commands

and functions, you will most likely find that the learning never stops.

Installation is automatic, prompting you for just a few easy answers. Norton Utilities saves copies of your original system configuration files with an .NUT extension and identifies any lines it disables in the revised configuration files, noting that they were "remarked by NUT7." The program also creates a customized Rescue Disk for your PC, which is bootable and includes the files and utilities you will need to repair your system in the event of a failure. Ease of learning earns

an excellent score.

EASE OF USE:

We found Norton Utilities 7.0 surprisingly easy to use, particularly in view of the variety of technical feats these utilities perform. You can run them from either Norton's main menu or the DOS prompt, adding appropriate command-line options and switches in either case. On-line help is available at virtually every turn, even at the DOS prompt. Most of the utilities offer an interactive operating mode, featuring similar display screens

with pull-down menus; clear, easy-to-understand prompts; and full mouse support. Operating procedures are, for the most part, uniform across all the utilities.

We rate ease of use excellent.

ERROR HANDLING:

Symantec has made Norton Utilities 7.0 about as safe and bulletproof as it can be without limiting its capabilities. Both the documentation and the utilities include prominent, informative warning messages whenever system or data damage is possible. DISKEDIT, the most potentially dangerous utility, is preconfigured to read-only mode; you have to deliberately change its configuration before it will write to disk. In addition, most of Norton's repair utilities optionally create Undo files on a separate disk that they use to restore things to their original condition if a repair attempt fails.

We saw little in the way of error messages. One that caused us some difficulty was an "Insufficient memory (9)" message, which appeared when we tried to run SPEEDISK on a 510MB hard drive that was percent full. The message included a recommendation that we run SPEEDISK from a DOS prompt rather than from within a shell. However, because we were not running a shell, this proved unhelpful. In addition, we could not find anything in the documentation about this error message. Symantec's technicians instructed us to run SPEEDISK from a bare-bones configuration that provided maximum memory, a successful solution that we'd already figured out.

The only other "flaw" we found was our previously stated problem with the NDISK tool and our Gateway machines. The two other error messages we received were the result of our own mistakes—trying to read an unformatted disk or to empty a drive—and all were clear and easy to understand.

Error handling earns a very good score.

SUPPORT:

Support policies: Symantec provides a 60-day money-back guarantee. It offers unlimited free (but not toll-free) technical support via phone 7 a.m. to 5 p.m. Pacific time, Monday through Friday. You can also receive support by fax, the vendor's BBS, and CompuServe. You also have the option of listening to a recorded collection of common questions and answers. Support policies are very good.

Technical support: The phone lines were jammed when we first called, reportedly due to the recent release of several new products, including Norton Utilities 7.0. Fortunately, by the end of our testing, we were able to get through. It took nearly 2 minutes to wind our way through the voice-routing system to the right technical support line, where we sometimes had to wait on hold anywhere from 5 to 30 minutes. Once we reached technicians, we found them knowledgeable, friendly, and eager to help us.

We rate technical support satisfactory.

VALUE:

Norton Utilities 7.0 lists for \$179 (you can get it for \$99 if you buy the MS-DOS 6.0). Upgrades for registered users cost \$49. Regardless of which price you pay, Norton Utilities pays for itself many times over. Considering the added features and capabilities, we find Norton Utilities 7.0 an excellent value. □

Tom Bigley is an experienced PC user who works in computer support for the city of Olympia, Wash.

Not Just Another Rubber Stamp



You see so many marks of approval in the computer products marketplace today, you have to wonder what they really amount to.

After all, an "Analyst's Choice" doesn't mean much if the analyst who picked it has computing priorities and performance criteria different from yours. And when you see things like "MVP" and "Award of Distinction," don't you sometimes wonder what they actually mean?

Well, here's what the InfoWorld Buyers Assurance Seal means:

GUARANTEED

To decide what products merit the Seal, we first ask some 1000 InfoWorld readers—real buyers and users of PC and networking products—what products, features and performance levels are important. Then we evaluate the products thoroughly in our renowned Test Center. Those that rate Satisfactory or better in every test category qualify for the Buyers Assurance Seal. Those that, in addition, score 8.0 or better in a product review or comparison qualify for the exclusive "Recommended Product" Buyers Assurance Seal.

But there's one more step. Before we award either Seal to a product, the manufacturer must agree to a 60-day replace or refund guarantee for software, or a 1-year repair or replace guarantee for hardware.

So when you're in the market for PC and networking products, look for the InfoWorld Buyers Assurance Seal. It's your guarantee that you're buying a product of proven performance and exceptional quality and value.

INFO MARKET

Combining vision and technology, products drive the PC industry. As innovations become standards, the next revolution begins...and the future history of computing is being written by the companies whose products appear in InfoMarket.

NEW PRODUCTS

What's new? It's a question computer users never tire of asking. Smart buyers and trend-watchers look here for the latest in PC products and services.

SOFTWARE

From E-mail to project management, spreadsheets to utilities, here you'll find a wide range of power and value in software, all conveniently designated by category and platform availability—DOS, Windows, OS/2, Unix, and Macintosh.

HARDWARE

Everything you're looking for in the way of hardware—from cables to keyboards, peripherals to complete systems. You'll find it here, in one easy-to-shop "hardware store."

DIRECT CONNECTION

Here's your "quick reference guide" to a broad array of PC products and services. All organized under convenient, easy-to-find headings.

COMPUTER CAREERS

Careers grow and change with the PC industry. For both computer professionals considering a change and companies in search of qualified people, this is the place to meet.

TRADESHOWS

For the PC industry, trade shows are where products get seen and business gets done. This section of InfoMarket keeps you informed of important current and upcoming industry events.

For information about appearing in InfoMarket,
call 1 800 227-8365.

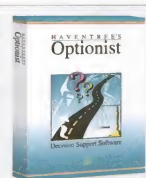
HAVENTREE'S

Optionist

Decision
Support
Software

Do you have to make important decisions?

HavenTree's Optionist can help you decide with confidence! Optionist gives you the tools to manage even the most complex decision-making projects. From hiring and purchasing to evaluations and investments; use Optionist and become a more creative and effective decision-maker.



- The Seven Step Decision Method (the Optionist formula for effective decision-making)
- Full network support
- Easy-to-use drop down menus and scroll bars
- Full reporting capability, from summaries to detailed reports
- Runs on any IBM PC, XT, AT, PS/2 or compatible with at least 400K of available RAM and DOS version 3.3 or higher.

See your dealer today or call:
1-800-267-0668 ext. 27
In Canada: 413-544-8035

HavenTree
SOFTWARE
P.O. Box 470-L, Elvertown, NY 13640-0470
400-800-0000

Quality. Savings. Service... Directly from Manufacturer



AMREL 486

UPGRADEABLE NOTEBOOKS

AMREL CPU Modules

AMREL ML486 Notebook computers feature state-of-the-art plug in CPU Modules for fast and economical processor upgrades. Increase your computing power by simply replacing the AMREL CPU Module. CPU Options include 386DX33, 486SX25, 486DX33, 486DX50 & 486DX72-66 MHz.

AMREL Docking Station

AMREL Docking Station delivers the power and expandability of desktop PCs to your ML486. Features include two 16-bit ISA slots, internal Fax/Modem, RS232 port, parallel port, SVGA, external keyboard port and room for a 5 1/4" drive.

AMREL Trackball

Convenient built-in trackball eliminates the need for awkward add-on devices.

1-800-88 AMREL
Fast Fax: (818) 575-0801

Starting as low as... **\$1795**
ADD IT ALL UP...

- 30-DAY MONEY-BACK GUARANTEE
- IMMEDIATE SHIPPING
- ONE FULL YEAR PARTS & LABOR WARRANTY
- 48-HOUR SERVICE TURNAROUND TIME
- TOLL FREE TECHNICAL SUPPORT

AMERICAN RELIANCE INC.
9952 E. Baldwin Place, B Monte, CA91731

How to make money with fax-on-demand

Customers call your Faccess®, select from hundreds of stored documents, enter their fax number and instantly receive by return fax the information they need to do business with you now...before your competitor's information is even in the mail.



• FACCESS® works 24 hours a day uninterrupted. Great for detailed product or customer support information.

• Order today, FACCESS® tomorrow. Works out of the box. Nothing else is required. Easy to set up. Callers love it.

• Join the thousands of companies making and saving money with this exciting technology from only \$2495.

For a live on-line demonstration call

800-FAX-DEMO

Request information document 444.

ComArt International

PO Box 1450 • Lake Forest, CA 92630
(800) COM-ARTS • (714) 859-2000



Your customers
dial for a fax
to get the facts
to buy now.

Free

STAND-ALONE LCD MONITOR

This 10" black on white monitor is easy-to-read, yet compact. Resolution is 640x480 for sharp, flicker-free image. Fast response, high refresh rate twisted nematic technology with backlighting provides a bright low radiation screen with a wide viewing angle. The adjustable monitor base is only 29x14 cm. It lets you mount the LCD monitor on vertical surfaces or fold for transport. Comes with 1.5 m cable and controller card. No external power required. IBM AT compatible.

New Touch Screen Option Available

New Touch Screen Option. Capacitive technology from MicroTouch™. Provides high resolution, fast response, all glass scratch proof optically clear touch sensor. Complete with controller and software. DOS Windows compatible.



To Order
Call Toll-Free:
1-800-DATALUX

DATALUX

155 Aviation Dr.
Winchester, VA 22602

Tel 1-703-662-1500
Fax 1-703-662-1682

Auto-Faxed Specs Fax
1-703-662-1675

Stop Copying Faxes!

PLAIN PAPER FAX

From Your Printer With

FaxPak

\$198

introductory Offer*



- No Computer Required
- Connects to Serial or Parallel Printer Port
- Connects to PC or Net Server to Share Printer
- Receives and Stores Faxes if Printer is Busy or Off
- Built-in Auto Switch to Share Phone Line with Telephone, Fax, and Answering Machine
- For Laser, Inkjet and Dot Matrix Printers
- 2 Year Warranty. Made in USA. 30 Day Money Back Guarantee

Orders:
1-800-669-3700
Teledisk Systems, Inc.

*Reg. \$299. Offer expires 6/30/93

The Best & the Brightest!

Project High-Impact Images on a Low-Impact Budget!

You can project vibrant color graphics, photographic images and even video with extraordinary color quality. Boxlight's Projectors, Projection Panels and Detachable Screen Computers make big impressions instantly and easily.

Want to try it for an important meeting? Ask about the Boxlight Lease and Rental Programs.



Keeping up with technological innovations and advances is a full time job. Ours. That's why most of the Fortune 500 companies, Big 8 accounting firms, major universities and institutions rely on Boxlight's expertise. We specialize in meeting and presentation technology. we can guide you to the products that will meet your current needs and prepare you for your future. And we'll do it at the best price available, we guarantee it!

Call our Sales Advisors TODAY!!!
(800)497-4009

30 Day Money-Back Guarantee

Ordering: Toll Free 800-497-4009 FAX 205-779-3290
Payment: Mastercard, Visa, AmEx (no charge) C.O.D. prepayment. Purchase before with some restrictions.
Shipping: Same day on most orders, UPS or Fed Ex.
Next Day & 2nd Day delivery available.



BOXLIGHT®
CORPORATION

COMMANDER™



Control up to 96 file servers with one keyboard, monitor and mouse!

- Supports PC, PC/XT, PC/AT, PS/2 and 100% Compatibles
- Remotely switch PCs via keyboard up to 250 feet away
- "AutoBoot™" Feature boots attached computers without operator intervention
- Supports either PS/2 or Microsoft/Logitech serial mouse
- Each unit accommodates from 2 to 8 PCs; cascade up to 12 units
- Able to Broadcast to all attached computers



CYBEX™

2800-H Bob Wallace Ave. • Huntsville, AL 35805 U.S.A.

(205)534-0011 • FAX (205)534-0010

Dealer Program Available

Made in USA



PC, PC/XT, PC/AT and PS/2 are registered trademarks of International Business Machines Corporation. Microsoft and Logitech are registered trademarks of their respective companies.

Seagate ST43400N 3.5 GB Hard Drive

- ST43400N 5.25" hard drive - 3.5 GB unformatted, Fast SCSI-2 interface, 10 ms average seek, and 5 year warranty
- ATS external hard drive solutions ship complete with drive(s), enclosure cabling, terminator and user's guide - fully tested with the option of Sun, HP or Mac formatting.
- "Plug n' Play" with PC, Mac, Sun, HP 9000, RS/6000, PS/2, and DEC platforms.
- To receive a FREE Seagate Mass Storage brochure, please call 1-800-793-8689



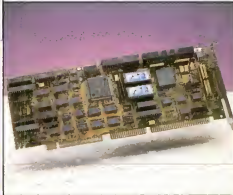
- 3.5 GB - 1 Bay ATS Subsystem
SRP \$5,652.00
- 7.0 GB - 2 Bay ATS Subsystem
SRP \$11,270.00
- 14.0 GB - 4 Bay ATS Subsystem
Call for pricing
- 28.0 GB - 8 Bay ATS Subsystem
Call for pricing

ATS
Advanced Technology Systems
800-359-3580

Seagate and the Seagate logo are registered trademarks of Seagate Technology Inc.

Local Bus SCSI-2

- Supports up to seven Fast SCSI-2 or SCSI-1 devices
- Supports two floppy drives
- ASPI software support
- Drivers for DOS, Windows, Novell, SCO UNIX, OS/2
- Uses NCR SCSI I/O Processor



Other VL-Bus products from AIR include SCSI and IDE controllers, SVGA accelerators, ISA and EISA motherboards. Call for local dealers. OEM and distributor inquiries welcome.

AIR
Advanced Integration Research, Inc.

2188 Del Franco St
San Jose, CA 95131
Phone: 408-428-0800
Fax: 408-428-0950

32-bit
VL-Bus
Mastering

Give your users a real productivity tool!

CUSTOM KEY IMPRINTING

Custom keys printed with color-coded software commands reduce keyboard errors and eliminate time lost looking up commands in manuals, help screens or pull-down menus!



- Cut Training Costs
- Boost Productivity
- Stand Out from the Competition

Call for your
FREE Catalog!

MOOLEON CORP.
258 Justin Dr.,
Cottonwood, AZ 86326
(800) 937-1337

486DX2 TFT Active Color NoteBricks from \$3,995

Now you don't have to compromise speed for a beautiful display or wait ages for a less powerful big name TFT notebook. Available now are Intel 33MHz 486DX, 50MHz and 66MHz 486DX2 powered systems with up to 340MB hard disks, 16MB RAM, built-in fax/modem, 6.5lbs. Hi-Res CRT output...all the good stuff. Call to order now.

Actual Screen shown



- 33MHz 486DX, 50MHz or 66MHz 486DX2
 - 128MB, 200MB or 340MB HDD
 - TFT Color LCDs, Mono, too!
 - FAX/Modem, Expansion Chassis
- \$3,995 for 486DX-33, 4MB, 120MB, 9" Color TFT**
For 24 hr. Automatic FAX info call 800-766-3961, code 1339
To order, M-F, 9-7 EST
1-800-633-1925

One International Way
Peabody, MA 01960
TEL: (508) 532-7110 FAX: (508) 532-7912

EXTERNAL PC-VIDEO CONVERTER

Converts VGA output to NTSC.

Turn any color TV into a computer monitor. Use "Off The Shelf" Software for animated presentations on TV.

INCLUDES...

- Video Converter
- Software Utilities
- Cables
- AC Adapter

NEW
LOW
PRICE
\$99

BOFFIN
LIMITED

612-894-0595

FAX: 612-894-6175
2500 W. COUNTY RD. 42 • #5
BURNSVILLE, MN 55337

ROBOFAX Fax-On-Demand

Robofax-EZ is a new technology combining fax and voice.

Customers call, Robofax-EZ answers and faxes out information without human intervention, 24 hours a day.

Robofax-EZ consists of two boards and software ready to install into an IBM-PC.



800-995-9141

FaxQuest Corporation
2211 Steiner Street
San Francisco, CA 94115
(415) 771-0923
FAX (415) 922-3666

Application Development

FAST WINDOWS DEVELOPMENT
New Version!

WindowMaker Professional™ - The industry Standard Prototyper and C/C++ Code Generator for Windows has gotten even better. New architecture uses Switch-R™ Code Generation Module for generating ANSI C, MFC C++, OWC C++ code, among others. Design applications by pointing & clicking. Visual Prototyper and embedded dialog box editor lets you test the look & feel and make changes on the fly. TrueCode technology ensures that user code is preserved during code generation. Generates the Windows .EXE with fully commented C or C++ source code and production files. CUA & SAA compliant. Incl. Toolbar support. No royalties. Highly recommended.

30 day money back guarantee.

Order Now!
1-800-677-4WIN

Blue Sky Software Corp.
7446 La Jolla Blvd., Suite 3
La Jolla, CA 92037 USA
Tel: (619) 459-6365 • FAX: (619) 459-6366

Utilities

WINDOWS HELP
AUTHORING SYSTEM

RoboHELP™ is an automatic authoring tool that makes the process of creating a Windows Help System just a matter of pointing and clicking. Guides the user through all the necessary steps - the user just fills in the actual help text when prompted. RoboHELP features a customizable tool palette. Generates source code for context sensitive help, hypertext link, cross reference, etc. RoboHELP takes care of generating the complex, precisely formatted RTF file(s). Programmers and non-programmers alike can develop a Help System under Microsoft Windows 3.x - no need to know anything about Windows programming or the Windows help Compiler.

30 day money back guarantee.

Order Now!
1-800-677-4WIN

Blue Sky Software Corp.
7446 La Jolla Blvd., Ste. 3
La Jolla, CA 92037 USA
Tel: (619) 459-6365 • Fax: (619) 459-6366

CourseWare



Starter Packs Only \$79



A complete series of over 50 effective, ready-to-teach courses for today's leading PC software packages. Introduction to advanced classes in

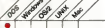
Lotus, WordPerfect, Windows plus many more!

Call For Your FREE Catalog
800-829-4ACT

In California: (213) 388-0551
Fax: (213) 388-2942

Accelerated Computer Training, Inc.
3255 Wilshire Blvd., Suite 903
Los Angeles, CA 90010

Utilities



AutoImport 2.1 Moves Data from Mainframe Reports into PC Spreadsheets and Databases



Translates into:
• Lotus 1-2-3
• Symphony
• Excel
• Quattro
• dBase
• Clarion
• delimited & more

- Selectively imports only needed data
- Adds data into existing spreadsheets or databases
- Inserts @ formulas for subtotals into spreadsheets
- Can run automatically from a menu or batch file
- Easy to use visual interface with point & pick operations
- Includes a TSR program to redirect printer output to a file
- Reads and translates headings, titles, %, signs, dates, international formatting symbols and more

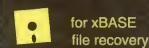
\$189 single user
For free demo or upgrade info call
(404) 449-1634

SPALDING SOFTWARE, INC.
154 Technology Parkway, Suite 250
Norcross, GA 30092

Utilities



“...next best thing to having a resident file recovery expert” Infoworld

dSALVAGE
PROFESSIONAL

PCWEEK Analyst's Choice
For: dBASE Fox dBase Clipper etc.
\$199.95 + \$6 SH (US) check/VISA/MC
dSALVAGE PROFESSIONAL: 800-456-7005

Comtech Publishing Ltd

Box 12340, Dept M, Reno, NV 89510

INFO: (702) 825-9000 FAX: (702) 825-1818

- Batch diagnosis
- Menu Driven... easy to use, fast
- Fix any damage. No file size limit
- All disk writes under user control
- Header/Record/Hex/Byte-stream editors
- Block handling, auto data resign
- Recover 250+ files with 1 stroke
- Recover cross-linked files

Asset Management



Cost Effective Inventory and Help Desk Software



The Inventory program is a comprehensive software package that manages computer assets and purchases. The Data Capture software automatically maintains the data collection task for the inventory module. The Trouble Log program allows users to track and resolve support calls and inquiries while logging common problems. Full reporting capabilities and utilities are included. Multi-user Network version and source code are available.

Call or fax us for a FREE Working Demo.

New Version 4.0

ConsulNet Computing Inc.
51 Paperbriar Dr., Don Mills, Ontario
CANADA, M3C 2E6
(416) 441-0363 FAX: (416) 448-1985

Utilities

Serious About
Hard Drive Setup?

- ▶ IDE Quick Install - Plug Drive In and DrivePro will make your drive "data ready" in under 60 seconds.
- ▶ Drive Table Override - Allows any BIOS to have user definable drive types. No device drivers required!
- ▶ Automatically identifies and displays information on ESDI, IDE and SCSI drives connected to the system. Actually retrieves manufacturer's recommended specifications from the drive itself.
- ▶ Complete list of hard drive specifications from 1984 to present.
- ▶ Guided install to walk the novice through drive installation.
- ▶ Allows you to use your IDE drives with existing MFM/SCSI/ESDI drives.

DrivePro
Professional Hard Drive Setup



For Complete Information call:

800 - 926 - 8299

FAX: 303-443-3323

BBS: 303-443-9957



Micro House 4900 Pearl E. Circle Suite 101 Boulder, CO 80301

CourseWare

EXPERT DOS INFORMATION
AT YOUR FINGERTIPS!

This definitive guide to DOS contains a complete review of basic and advanced DOS functions, with a 250 page Reference and FREE Norton Commander Special Edition on disk!

- Covers DOS 2.5 and the DOS 5 Shell
- Running programs and batch files effectively
- Getting the most from memory and system configuration

PC World DOS 5 Complete Handbook

by John Socha and Clint Hicks
ISBN: 1-478056-13-4. 616 pages, includes one 5 1/4" disk.
\$34.95 USA/\$44.95 Canada, + \$4.00 s/h.

To order, call IDG Books at:
1-800-762-2974, 7 a.m. to 5 p.m. PST

9-TRACK AND 3480

Rock solid solutions for PCs and workstations. Rock bottom prices.



- Exchange data with minis & mainframes
- Reliable, lightweight, compact, 1600 and 6250 bpi 9-track solutions manufactured by Overland Data
- PC solutions include the latest Overland Data controllers and DOS software
- A variety of workstation platforms are also supported

Call 7 AM - 5 PM Pacific Standard Time.

800-729-8725

Overland Data Inc. since 1980
619-571-5555 • FAX 619-571-0832
Europe (+49) 8172-35027 • FAX (+49) 8172-35028
3480 Now With IDRC!

Thrive in the Data Jungle...

With the Percon® family of Bar Code Reading Products!

**DECODERS • INPUT DEVICES
PORTABLE BAR CODE READERS****PERCON IS YOUR
BAR CODE
SOURCE!**

All Percon products are proven and reliable, with excellent first try read rates, exceptional warranties, toll-free technical support, and rapid shipping on most orders and repairs.

**CALL US TODAY!
1-800-929-3951**

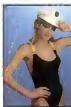
**NEW...Multicolor Marker
For LCD/Projection
Systems**

Get your point across using the Magic Pointer-250 (combination electronic marker, chalkboard, label and pointer), by overlaying freehand creations on any computer-generated projection. The 100% hardware system comes complete with cables for plug and play action. Features include eight color selection, transparent, blurring, erasing and variable line width. Supports ALL analog computer video displays.

\$995.00 includes UPS 2nd Day Air

Educational Discounts Available
Dealers Welcome

Applied Computer Systems, Inc.
3000 Johnstonville Rd., Johnston, OH 43031
Phone: 800/237-5415 • Fax: 614/892-4838

**MICRONICS
VESA 66**

\$1999

**We Can Ship Today!**

- USA-Built MICRONICS 486 VESA/66
- 8MB SIMM Memory: 70ns
- 245MB Maxtor #7245 HardDrive
- 1.2 & 1.44 Mb 3.5 Floppy
- Micronics 32-Bit VESA Video Card
- Northgate Omnikey ULTRA Keyboard
- PC Power & Cooling Fan
- One Year Warranty - Parts & Labor

CALL FOR SPECIAL CONFIGURATIONS

3-6 COMPUTERS • 213-466-3636

FAX 213-466-3693

**9 TRACK TAPE 3480
CARTRIDGE CONVERSION
SYSTEMS**

Systems Conversions Rentals
Read and Write any 9 track tape or 3480 tape cartridge with your PC (DOS/UNIX).

9 track tape subsystems:
1600 Bpi from \$1395.00
6250 Bpi from \$2895.00
3480 from \$8,995.00

Call today for the best data conversion systems available.

(800) 938-TAPE • (702) 254-2648

Laguna Data Systems

7340 Smoke Ranch Road, Suite C

Las Vegas, NV 89138

FAX: (702) 254-0910

**3480 Tape • 9 Track • 8mm • 4mm DAT
GET MORE POWER FROM YOUR TAPE DRIVE!**

Complete subsystems
All major PC
and MAC Platforms
Downsizing? Growing?
Call us, we can help!

Data Interchange &
Backup/Restore
Network Experts

novastor

30861 Aguirre Rd. Suite 109
San Ramon, CA 94583
Phone: (925) 396-3616 (toll-free) 1-800-707-9522
Fax: (925) 396-3616



"On a typewriter, the lowercase letter l and the number 1 are often the same. Not so with a computer. If you're typing 1,001, for example, don't type 1.001 by mistake - especially when working with a spreadsheet. (The same holds true for the uppercase letter O - and the number 0. They're different.)"

- PCs For Dummies

PCs FOR DUMMIES™
By Dan Gookin & Andy Rathbone
\$16.95 USA \$21.95 Canada,
+ applicable sales tax & \$4.00/sb
To Order:
Call IDG Books at:
1-800-762-2974
8 a.m. to 5 p.m. PST

Bar Code Headquarters**Portable Readers**

- Attaches to PC, Mac, Serial Devices and Modems
- Battery operated. Very easy to program.
- 64K - 256K memory
- Bar code or keypad input
- 2x 16 Superwired LCD
- Real-Time Clock
- Keyboard or Serial Interface
- Program Generator
- 2 Built-in Inventory Programs
- 3 User Defined
- Wand, CCD, or Laser
- Keyboard or Serial Uploads
- Downloaded Tables for Verification
- Simple, Powerful, Versatile, and Easy
- Complete 64K units with Laser Scanner - **\$1734**
- Complete with Wand - **\$789**

**Bar Code Readers**

for PC, XT, AT, PS/2, Macintosh
and all RS-232 Terminals



- Attaches as 2nd keyboard
- No software changes
- Asks, 128, C29
- UPC/EAN, etc.
- Top Rated by Independent Review
- Magnetics, laser, CCD, or wand input
- Complete with Stainless Steel Wand - **\$399**

Labeling Software

- For Epson, OKI, IBM, and LaserJet. Any Format.
- On-Screen Label Design, WYSIWYG.
- 16 text sizes - 3" reads at 100
- 20fs, 128, UPC/EAN, AIAG & Code 39
- Auto-incrementing. File input. Logos, symbols
- Reversible, color, soft fonts. Powerful, versatile, fast!
- Rotatable, shadable, scalable fonts on LaserJet
- LabelRIGHT™ (for Dot Matrix & Laser) - **\$279**
- Formats for: K-Mart, Sears, Pennys, Wal-Mart, ALIAG, LOGMARS, etc.
- Other bar code Programs from **\$129**

**Thermal Transfer Printers**

- 2" per second Thermal Transfer - Up to 4" wide
- Supports all Popular Bar Codes, 1 year Warranty
- Small Footprint - Light weight (20 lbs)
- Prints Bar Codes, Big Text, and Pict Graphics
- Complete with labels, ribbon, cable, LabelRIGHT software, and Fargo Allegro Printer - **\$1895**

Ordering is Easy!

- Qualified PO's Accepted • Free UPS Blue in the USA
- 2 Yr Warranty on Wands and Readers
- Direct From the Manufacturer
- Same Day Shipping • All Items in Stock
- Free Phone Support • 30 Day Money Back Guarantee

In US or Canada Call Toll Free

800-345-4220

WORTHINGTON
DATA SOLUTIONS

3004 Mission Street • Santa Cruz, CA 95060
408-496-9964 FAX • 408-496-9938 Phone

HARDWARE

HARDWARE

Great Printers, Prices and Service from

GREAT BUYS™

800-44-HPLJ1

1200 dpi PostScript Imagesetter

PostScript "Color Laser"

Maxi-Res™

Plain Paper Text/Type

Tektronix II PXI



- 8 PPM w/ Fast RISC CPU
- 1200 x 1200 dpi
- 18 MB Ram
- 35 Scalable Fonts
- PostScript Level II Compat.
- Superb Text and Graphics
- Fast Bidirectional Par. Port

\$2,995 Complete

- Fast AMD RISC CPU
- 300 x 300 dpi
- 8 MB Ram
- 1 YEAR On-Site Service FREE!
- ADOBE PostScript Level II
- Unique TEKCOLOR Enhanced
- Par. SCSI, RS-232 and AppleTalk

\$3,495 Complete



GREAT BUYS

800-444-7551

IT DUPLICATES EVERYTHING EXCEPT YOUR EFFORTS.

With dimensions of 10"x36"x16", the Tracer/ST is no bigger than a typical laser printer.



Announcing the most effortless way to copy diskettes. The Tracer/ST—the affordable desktop system that formats, duplicates, and verifies hundreds of diskettes per hour. Automatically.

Better yet, the Tracer/ST family grows with you.

Options can double output, support a network, or simplify storage with an internal hard disk.

So call 800-872-2318 for the duplication system that can't be duplicated anywhere.



©1990 Trace. All trademarks are property of their respective holders. Fax us at 408-641-3390 or write to Trace, Dept. B, 3945 E. Buckhorn Road, San Jose, CA 95131.

BAR CODING



BAR CODE READERS

AMERICAN MICROSYSTEMS

2190 A Regal Pkwy. • Eufess, Texas 76040 • (817) 571-9015

FOR PC, XT, AT, PS/2 & TERMINALS:

- No software changes required
- Data appears as keyboard input
- Reads Code 39, 1-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Auto-discriminates between codes
- Accepts WAND, SLOT, CCD, LASER, MAG STRIPE



(800) 648-4452 • FAX: (817) 665-6232
30 Day Money Back Guarantee
One Year Warranty

GET RESULTS FROM INFOMARKET ADVERTISING.
FOR MORE INFORMATION, CALL (800) 227-8365

MEDIA CONVERSION

DATA CONVERSION

DISKS, TAPES, CARTRIDGES

OPTICAL SCANNING

DISKETTE TAPE DUPLICATION

NBC CONVERTS DATA DOCUMENTS BETWEEN MORE COMPUTERS THAN ANYONE ELSE!!

WORD PROCESSORS, MICRO MINIS, DATABASES, MAIL LISTS, ACCOUNTING DATA

IBM, DEC/VAX, APPLE, WANG

WordPerfect

Lotus, Dbase

CPT, Lanier

MS, NBI

DISPLAYWRITER

AS-400, XEROX, C/P/M, UNIX ...

(212) 463-7511

NATIONAL DATA CONVERSION INSTITUTE
9 East 16th Street, New York, NY 10003

AMERICA'S LEADERS IN DATA CONVERSION

DATA CONVERSIONS

CD-ROM Mastering

DUPLICATION

of diskettes/tapes/CD-ROMS

2500 Word Processing & Computer

Formats, 3 1/2", 5 1/4", 8" DISKS

COPIES/REPRODUCTION

9-TRACK, 3480, 8mm, 4mm,

Colorado, Mountain, DC2120,

TK50 TAPES, 1/4" Tapes, Squelch &

Bermouth Cartridges, Magcards,

Quick Turnaround Satisfaction Low Prices

1-800-374-DISK

COMPANY COMPENDIA, INC.

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...

(800) CONVERT

Capabilities include over 3000 formats.

PIVAR

COMPUTING SERVICES, Inc.

80 Arlington Heights Rd. in

Buffalo Grove, IL 60089

(708) 684-8200

QUALITY CONVERSIONS

OVER 3000 FORMATS

FREE TEST CONVERSION

QUICK TURNAROUND

LET US TEST YOUR DISKETTES

WORD PROCESSORS • TAPES

OCR SCANNING • CARTRIDGES

DISK & TAPE DUPLICATION

CALL FOR LOWEST PRICES

ALL DATA CONVERSIONS 3000 PHS/PHS/CD

SAFETY HAZARD, FL. 3000 (813) 794-3447

800-955-5245

Sell your product or service

in InfoMarket. Join the

thousands of advertisers

who know.

SERVICES



CORPORATE DISK COMPANY™

CD TECHNOLOGIES, INC. • CD MARKETING, INC.

DISKETTE DUPLICATION



"THE ONE STOP SHOP FOR SOFTWARE DEVELOPERS"

STOP going to 5 different suppliers! It can all be done with one easy phone call.

Our Services Include:

- Printed Diskette Sleeves
- Printed Diskette Labels
- All Forms of Software Packaging
- Printed Documentation Pages
- Silk Screened Diskettes
- Duplication Equipment
- Low Cost Diskettes

ALL MASTERS CHECKED FOR VIRUSES

"You have to make but one phone call to the Corporate Disk Company and consider the job done"

In Illinois (708) 616-0700
Nationwide 1 (800) 634-DISK

© 1992 by CD Marketing Inc.

©1991 by CD Marketing Inc.

SPECIAL COUPON

Canon

LBP-4sx

\$669

4ppm
300 dpi

BJ-200

360 dpi

\$275

after rebate

NoteJet

486 \$2699

486SLC/25 Notebook
4MB RAM, 180 MB HDD
360 dpi Bubble Jet Printer
built in! Weighs 7.7 lbs

CSS

ph: 708 498 0061
fx: 708 498 0046

SERVICES

DUPLICATION EQUIPMENT

For in-house duplication, MediaFORM is the source. We sell and service high-quality software duplication and labeling equipment. And we can tailor a complete, cost-effective system to meet your specific needs.

MediaFORM • 800-220-2125

215-524-7000 (in PA) Fax: 215-363-5735
Eaton, Pennsylvania 15141



Copies Both 3.5 & 5.25 Disks.
Like Two Machines for the Price of One.

InfoWorld Mailing List Policy

Periodically, InfoWorld allows selected companies to use its mailing lists. Each mailing is carefully screened so that you receive only those offers which InfoWorld feels would be of interest to you.

If you would prefer not to receive any promotional offers from these companies, you may request that your name be removed from these mailings. You may do so by writing to us at:

INFO WORLD

InfoWorld Lists
155 Bovet Road, Suite 800
San Mateo, CA 94402



DUPLICATION FROM \$49 HIGHEST QUALITY MEDIA

MSDOS duplication from **\$49** (\$5.25) and **\$69** (\$7.75). Prices go even lower as you continue to order!

- Duplication • 100% Verification
- Custom Labels/Screening/Masters
- Custom Packaging & Assembly
- Colored Media Available
- Special Rates For Demo Software & Site Licensing
- Educational Discounts Available
- 24 Hour Turn-Around
- Guaranteed Products

800-255-3142

Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

Reach your prospects quickly in InformaTOD DIRECT CONNECTION.

Diskette Duplicator

240 Copies per Hour
Using any IBM PC/XT/AT
or Compatible.

\$1,895



Desktop Autoloaders also available, for unattended use. For information, or to order, call **510-651-5580**.

Dataphat

DATA RESCUE

— 24 HOUR SERVICES —
We rescue your data from Novell, UNIX, DOS, Mac, Wang-VS, DEC, tape, hard or floppy drive!

800-234-4379
FAX 415-546-1708

935 Vito, San Francisco, CA 94110

*Ask for your FREE book of how to save your hard drive and your sanity!

CD-ROMs

Specialized CD/Shareware titles. 30 day guarantee. Detailed database index. \$9.95 per product. \$25 each additional. Also on demand. Vuu, Mac, Amiga, CD.

CD-ROM • 2-2nd/3rd CD-ROM • Products
ASAP 300 C/C++ 890
Antec CD Units 300 750
Neware Units 300 ObjectVision Units 300
OS2 Unit 300 Paradox Units 300
SmallBusiness 175 TrueType Fonts 300
Pascal Units 300 Windows Units 300
EMM: 4800 Buckhard C/C++ 890 M2032
1000/300/250 Fax300/300/300

Publishing and Closing Dates:

InfoWorld is published every Monday. Ad closing and Classified copy due by Wednesday noon, 12 days preceding cover date of each issue.

For more information call:
(800) 227-8365 or (415) 572-7341

SUPPLIES

DATA CARTRIDGES VERBATIM • BANY

TAPE & SIZE	5s	10s	25s
DC 2000 (4000)	12.75	12.00	11.25
DC 2100 (12000)	17.25	16.25	15.50
DC 600A (6000)	18.00	17.25	16.50
DC 6150 (15000)	18.00	16.00	17.25
DC 6525 (52500)	28.50	27.50	26.00
AMC 100 (100)	16.00	15.00	14.25
BMM 112M	11.75	11.00	10.25

• MANUFACTURER LABELED
• DGC4 & DGC6 Formatted Add \$3.00
• BULK, SPECIAL, SPECIAL VOLUME
• DISCOUNTS FOR SOFTWARE DEVELOPERS

800-255-3142

Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

COMPONENTS



+ MEMORIES PLUS +

14252 Culver Drive, Suite A-116
Irvine, CA 92714-1867

American Express C.O.D.

COMPACT LAPTOP & NOTEBOOK MEMORY				IBM LAPTOPS & NOTEBOOKS				HARD DRIVE			
Contains Manufacturer's Laptop		Model	Price	Model		Memory	Price	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 1	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 2	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 3	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 4	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 5	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 6	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 7	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 8	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 9	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 10	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 11	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 12	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 13	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 14	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 15	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 16	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 17	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 18	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 19	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 20	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 21	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 22	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 23	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 24	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 25	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 26	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 27	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 28	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 29	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 30	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 31	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 32	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 33	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 34	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 35	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 36	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 37	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 38	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 39	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 40	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 41	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 42	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 43	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 44	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 45	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 46	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 47	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 48	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 49	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 50	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 51	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 52	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 53	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 54	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 55	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 56	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 57	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 58	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 59	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 60	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 61	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 62	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 63	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 64	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 65	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 66	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 67	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 68	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 69	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 70	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 71	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 72	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 73	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 74	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 75	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 76	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 77	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 78	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 79	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 80	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 81	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 82	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 83	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 84	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 85	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 86	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 87	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 88	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 89	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 90	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 91	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 92	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 93	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 94	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 95	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 96	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 97	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 98	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 99	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 100	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 101	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 102	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 103	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 104	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 105	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 106	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 107	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 108	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 109	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 110	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 111	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 112	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 113	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 114	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 115	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 116	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 117	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 118	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 119	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 120	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 121	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 122	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 123	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 124	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 125	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB	115.00	Model 126	16MB	115.00	115.00	IDE			
Compaq 161T/386	161T	16MB									

EDITORIAL INDEX

Network Applications	
Arcserve, Version 5.0.....	43
Epoch 1.0 calendaring software.....	42
KeyServer, Version 3.1.....	42
MacPac Software Development Kit.....	42
MBR, Version 7.0.....	42
Qmodem Pro, Version 3.1.....	46
Wildcruit A/UX.....	42
Relocatable Board System, Version 3.9.....	46

Network Hardware

Advanced SNA/IP open systems package.....	43
Ansel NS 2100-3.....	66
Cabletron E2110.....	66
CNet CN6000.....	66
DNX 300n router.....	43
D-Link DE2200T.....	66
Eagle NE2000 Plus 3.....	66
FDD/CDI Workgroup Hub.....	44
FD 27247B PC LAN Adapter/16 TP Plus66.....	66
IBM LAN Adapter for Ethernet.....	66
Intel EtherExpress FlashC LAN Adapter.....	66
LAN Rover/1 for NetWare.....	42
NetWorth UTP 168 10Base-T interface card.....	66
Rascal InterLAN N6S10.....	66
SCM EtherCard Plus Elite16T.....	66
Thomas-Conrad TCS143-T Ethernet Adapter.....	66
T-Runner.....	44
3Com EtherLink III 16/16 Combo.....	66
10Base-T interface card.....	42

Network Management

GraceLAN Server Manager.....	42
VisiNet.....	42

Peripherals

FastMap graphics accelerator board.....	29
Fast SCSI-2 Model 210B.....	29
GraphMap graphics accelerator board.....	29
MAU Ultima graphics card.....	30
MPC Level 2 upgrade kits.....	35
Pocket Hard Disk.....	35
VGA Wonder GT accelerator card.....	30
Viper PCI accelerator board.....	34

Printers

Apple Color Printer.....	29
BJ-230 bubble-jet printer.....	34
LaserMaster's Display Maker Digital Color Printer.....	35
Personal LaserWriter.....	29
SI-144 ink-jet printer.....	30

Productivity

Abacus II PC accounting package.....	17
Canvas, Version 3.5.....	17
Common Ground, Version 1.0.....	18
Einstein.....	24
FCS for Windows.....	17
InfoPublisher, Version 2.0.....	17
My First Font Pack.....	34
Microsoft Bookshelf.....	17
Pen Magic's Numero, Version 2.0.....	17

Systems

ActionNote 45L2/25 notebook.....	29
APF4000 desktop computer.....	30
Dell Dimension systems.....	35
DTR-1 hand-held computer.....	29

Tools

Database Development Kits for DB2.....	17
Database Development, Version 2.0.....	18
Quota Quest.....	23
Mozart, Version 3.2.....	17
Norton Utilities, Version 7.0.....	23
PowerBuilder Development Environment for DB2.....	17
SQLWindows 4.0 Standard Edition.....	17

ADVERTISING SERVICE REGIONS

Steven Drace
Director of Democratic Editions
(415) 572-7341

Northern California Pacific Northwest

Joe Kewen
Vice President
Western Advertising Director
Jan Davis
Sales Administration Manager
Kelly Nedd
Account Manager/No. Calif.
Ron Hall
Regional Manager/
No. Calif. & Utah

John Masi
Account Manager/
No. Calif. & Utah
Steve Moylan
Regional Manager/
No. Calif. & Washington
Michael Hamilton
District Sales Manager/No. Calif.,
Washington, Oregon & Utah
Kelli Flanagan
Account Manager/
No. Calif. & Washington
155 Bevel Road, Ste. 600
San Mateo, CA 94402
(415) 572-7341

Southern California, Los Angeles, Santa Barbara

Karen Niles
Regional Manager
Racial InterLAN N6S10
Debra Wright
Account Manager
11835 West Olympic Blvd. Ste. 1055
Los Angeles, CA 90064
(310) 312-8018

Orange County & Colorado

David Prosenko
Regional Manager
Susan Egan
Account Manager
18008 Sky Park Circle, Ste. 145
Irvine, CA 92714
(714) 250-1305



Central

Renelle Hicus
Regional Manager
Amber Schmitz
Account Manager
14651 Dallas Parkway, Ste. 304
Dallas, TX 75240
(214) 233-3498

Southeast

Jim Shannon
Regional Manager
Mindy Blankenship
Account Manager
1400 Lake Haven Drive, Ste. 330
Atlanta, GA 30319
(404) 394-0758

New England

Vicki Gynn
National Accounts
Director/Regional Manager
Carol Fountain
Regional Manager
Tana Howes
District Sales Manager
Luzanne Newman
Account Manager
4 Chrysler Road
Norwich, MA 01760
(508) 620-7150

Mid-Atlantic

Ian Ross
Eastern Advertising Director
Roxanne LaBruno
Sales Administration Manager
Steve Martin
Regional Manager
Joanna Parker
Regional Manager
Cindy Zuck
Regional Manager
Christine Lewandowski
Account Manager
Florence Mihaw
Sales Support Coordinator
365 West Passaic St.
Rochelle Park, NJ 07662
(201) 987-0290

Special Editions & InfoMarket

Diane Templin
InfoMarket Advertising Director
Marc Calvance, Sharon Chin
Joanne Feigen, Vicki Kline
Dennis McSwain, Lisa Weiler
InfoMarket Sales Staff
155 Bevel Road
San Mateo, CA 94402
(415) 572-7341

UPCOMING IN INFOWORLD

JUNE 7

PRODUCT COMPARISON

Color LCD Projection Panels. As lightweight traveling companions, color LCD projection panels interface a portable PC to an overhead projector to put impressive presentations on a big screen. InfoWorld surveys the active matrix projection panels competing for market share, all with 640-by-480 or better resolution, including units from 3M, InfoFocus Systems, Apollo Audio Visual, Proxima, Sharp, and Tekel. We will assess color fidelity and all-around display quality, measure color reproduction, and compare ease of setup and overall performance.

ENTERPRISE COMPUTING

Feature: Integrating Unix workstations and servers into the PC LAN environment. We take a real-world look at what you can and cannot do to provide end-users with application-level interoperability.

Management: How IS departments around the country are redefining mainstream computing with the integration of PC LAN and host systems. The goal of end-user information access requires not only systems interoperability but the cooperation of previously separate PC and host support staffs.

JUNE 14

PRODUCT COMPARISON

Portable PCs With Docking Stations. For users who split their computing time between the road and their offices, notebooks with docking stations offer the best of both worlds and the easiest way to live the "double life." Combining our usual desktop and notebook computer testing protocols, InfoWorld will evaluate portable PCs with docking stations from several leading manufacturers, including Apple, ARC, Compaq, IBM, and NEC. We will assess screen readability, keyboard quality, hardware and software compatibility, and expandability.

ENTERPRISE COMPUTING

Feature: Windows NT — Is it the next-generation LAN client operating system or a high-end server operating system? Microsoft says both. InfoWorld looks at how NT will fit into existing corporate LAN systems.

InfoWorld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Thirty-five million people read one or more International Data Group publications each month.

ADVERTISER INDEX

Apple.....	50-51
Computer Associates.....	13
Corel.....	12
DCA/Novell.....	34
Dell Computers.....	22
Digital Equipment Corporation.....	42A,102
Egghed.....	19
Gateway.....	72-73
Hayes.....	9
IBM.....	38
IBM Personal Software Products.....	7
Kingston Technology Corporation.....	28
Knowledgeware.....	27
Lotusmark.....	40-41
Lexus Development Corporation.....	31
Megahertz.....	36-37
Microsoft.....	20-21, 54, 55-64, 65
NEC.....	76-77, 86-87, 101
Next.....	44-45, 46-47
Northgate.....	84
Novell.....	32-33
Sunsoft.....	24-25
Symantec Corp.....	16
Toshiba America Information Systems.....	60-61
WordPerfect.....	2, 2A-D, 10-11, 23, 34, 85

Subscribing to InfoWorld: A one-year subscription to InfoWorld costs \$130 for subscribers in the United States and \$145 in Canada. Call (800) 457-7868 or (708) 647-7341. Subscriptions to InfoWorld are available in Europe for a price of \$495 per year. By special arrangement, copies are sent by air freight to and redistributed from London, with arrival generally within three days of publication date. For more information, contact Parkway Gordon, Westwood House, Elmhurst Road, Gordons-Thames, Reading, RG8 8BN, England. Telephone: 44 (0) 491-875388, Facsimile: 44 (0) 491-875524.

InfoWorld on CD ROM/On-line: You can get full-text of InfoWorld News and Reviews on computer Library's Computer Select CD ROM. Full text is also available through Ziffnet on CompuServe. To access Ziffnet, type go ZNTCDROM+ at the prompt. To reach Computer Library, call (800) 827-7889, or (212) 503-4400.

Reprints: Send all requests to Permissions Editor, 155 Bevel Road, Suite 600, San Mateo, CA 94402.

Photocopy Rights: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by InfoWorld for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$5.00 per page is paid directly to Copyright Clearance Center, 27 Congress St., Salem, MA 01970. Please specify: ISSN 1091-5649. Permission to photocopy does not extend to contributed articles followed by this symbol: i. InfoWorld can also be purchased on 35mm microfilm from University Microfilms International, Periodical Entry Department, 300 N. Zeeb Road, Ann Arbor, MI 48106; (313) 761-4700.

Buyers Assurance: A standard for assuring customer satisfaction with PC products, the InfoWorld Buyers Assurance Seal is awarded only to those products that have been evaluated by our on-site Test Center and Review Board and received a satisfactory or better score in every test category. The exclusive Recommended Product is reserved for those products that have met the standard criteria and scored 8.0 or better in every test category or product comparison. In addition, the Buyers Assurance Seal signifies that the product manufacturer has signed a limited replacement or refund guarantee. Look for the Buyers Assurance Seal in InfoWorld reviews and product comparisons and when you are shopping for PC products.



PC DOS / from page 1**IBM may ship DOS without compression**

son utility is that it wants to make sure the technology it chooses works smoothly with OS/2.21.

One problem Microsoft has with DoubleSpace is that it makes MS-DOS 6.0 compressed files incompatible with Windows NT. Microsoft has acknowledged that the first NT release will not support the DoubleSpace utility.

"We are very interested in having our DOS users move to OS/2, so we want to provide a compression technology that lets them do that," said Lee Reiswig, president of PSP.

IBM officials have discussed licensing Stac Electronics Inc.'s Stack Compression program for DOS and Windows, but no deal has been reached yet. A second option for a compression utility for PC DOS would be a "Stacker-like" program IBM has developed internally, officials said.

IBM has not decided whether to release PC DOS version 6.0 with a compression utility will be called 6.1, according to Reiswig. PSP still plans to ship the first version of PC DOS in late June

or early July, with the follow-up coming a month or two later, one IBM official said.

IBM has also reached an agreement with Paper Software Inc. of Woodstock, N.Y., to license that company's graphical shell for inclusion with a future version of PC DOS 6.0.

The shell, called SideBar, has the look and feel of PSP's Workplace Shell and some of its features, including drag functions and graphical folders. SideBar can operate in less than 280KB, compared with the several megabytes that OS/2's Workplace Shell requires.

IBM will customize SideBar, originally written as a Windows shell, to resemble the Workplace Shell, although the program launcher, IBM said.

IBM and Paper Software said the graphical shell would be in beta testing sometime this summer, but they declined to give an availability date.

Other new features in PC DOS include support for PCMCIA; pen support for DOS; and an improved editor, E-Editor, borrowed in part from OS/2.

PORTABLE / from page 1**Apple, HP raise curtain on communicators**

modern and three months of access to AppleLink that will expand to include wireless and wireless services.

At the high end, users will get the AppleLink connection, additional services, and a PCMCIA card with a standard modem and a radio modem.

After three months, users will be able to continue accessing AppleLink for a fee, sources said.

Apple has yet to set some of the base-level specifications of the device, which will include a

601 RISC chip developed by ARM, a PCMCIA card slot, a pen operating system, infrared communications, and a touch-screen display, according to four penlight batteries.

The base-level system is expected to include 2MB of ROM and 1MB of RAM that can be expanded to 4MB.

HP will provide a different form of personal communications with its \$2,000 OmniBook 300, to be introduced June 7.

The 2.2-pound computer, which will ship immediately, will have infrared communications that allow it not only to exchange data with PCs but to remotely operate them as well.

Like Newton, the OmniBook 300 will use Traveling Software Inc.'s Universal Communications Object linking code, sources said.

The code recognizes the hardware involved and optimizes file transfer to those machines.

A key feature of the OmniBook 300 is its full-size keyboard. (See "HP puts full-size keyboard in subnotebook," March 29 page 1.)

The keyboard allows users to touch type and to operate the system as they would any other Windows PC. It has a new type of pointing device that pops out from the right side. The 3.3-volt system can operate for 5 to 10 hours, depending on configuration.

—*Stuart J. Johnston contributed to this article.*

NT / from page 1**Keeps apps waiting**

"Our complete line of database servers and application development tools will be available on NT within the coming year," said Tim Shelter, vice president of product marketing at Informix. New to Windows is Informix-GI, for iVT, due out 90 days after NT ships.

NT will bring some other robust client/server systems to Windows for the first time. Objectivity/DB Starter Kit for NT will let developers deploy single-user, object-oriented database applications under NT and Windows 3.1 via Win32s. Objectivity Inc. plans to ship the product in August for \$2,995. A multi-user version will follow.

Bachman Information Systems Inc. will ship CASE tools for NT within six months.

Intersolv Inc. will ship its PVCS version control develop-

Client/server vendors target NT for development releases

(all products are for Windows NT for Intel)

Servers

Microsoft SQL Server
Oracle7
Gupta SQLBase Server
Ingres Intelligent Database
Informix-SE

Availability

60 days after NT ships
ASAP after NT ships
30 days after NT server ships
90 days after NT ships
Summer 1993

Clients

Microsoft Visual Basic
Borland Paradox
Powersoft PowerBuilder 3.0
Gupta SQLWindows
Software Publishing Superbase

Availability

TBA
TBA
1993
1993
1993

ment software for NT soon after NT ships. Q+E Software will ship Windows NT versions of its products within six months. IBM's shipping, allowing time for ODBC and other database

connectivity pieces to ship, said James Hebert, vice president of business development. Sher, William Kelley Dammore, and Jim Hammett contributed to this article.

CC:MAIL / from page 1**Upgrade delivers rules-based routing**

(MTA) on multiple platforms.

"We expect to release the cc:Mail X.400 MTA in early 1994 and stage the release of various platforms in the ensuing months," said Rex Cardinale, vice president and general manager of the cc:Mail division, in Mountain View, Calif.

cc:Mail for Windows Remote will come 90 days after the release of cc:Mail for Windows 2.0, Cardinale said.

Meanwhile, Lotus will unveil cc:Mail Wireless at the Electronic Mail Association show in Atlanta. Lotus declined to com-

ment on the release date, but sources said the wireless version will be released on systems from wireless providers RAM Mobile Data and Ericsson GE Mobile Communications Inc.

Other cc:Mail versions are slated for release by the end of this year. The OS/2 2.1 version, stalled by IBM's delay of that product, will go out approximately one month after IBM releases OS/2 2.1 Workplace Shell, according to Cardinale.

Lotus will roll out cc:Mail on Hewlett-Packard Co.'s Motif and on IBM's AIX by year end,

Cardinale said.

The rules-based mail processing in Release 2.0 provides a tool for managing both incoming and outgoing messages based on criteria set by the user or administrator.

Other features include auto-routing, filtering, simplified mailbox management, a spelling checker, the capability to import or export a file without the use of the clipboard, trash folders, and the capability to store a message in progress, said Chuck Stegman, cc:Mail enterprise marketing manager.

Release 2.0 will carry the same price tag as Release 1.0: \$495 per post office. Lotus will provide upgrade pricing in June.

Lotus SmartSuite 2.0 improves ties to Notes

Lotus Development Corp. announced today that it has designed the SmartSuite 2.0 application bundle for tighter integration with Lotus Notes.

Also, Freelance Graphics for Windows, and 1-2-3, Release 4 for Windows can all store files on a Notes Server. These files include various search fields, such as size, author, last update, or subject; they can be searched using

these fields as criteria through Notes Views. This method allows a user to, for example, find all the worksheets from a particular sales manager, or those that have been created within the last week.

The \$795 applications bundle, set to ship in June, also has the SmartSuite Application Manager, a tool that makes it easier to toggle between applications.

RECALL / from page 1**Short circuit in IBM notebook forces recall**

The short circuit occurs when a conductive object, such as a paper clip or a metal screw, touches the system's circuitry.

Although IBM officials believe the possibility of widespread incidents is remote, they are voluntarily recalling the systems and will repair free of charge all 1,405Xes worldwide.

Until users return the systems, however, IBM recommends that they take out the battery and power the system through

its AC adapter. They also suggest that users disconnect the AC adapter when they leave the system unattended.

"I would view this as extremely positive, because at least IBM is taking action," said Bob Holmes, computer technology research analyst for Southern California Gas Co. in Los Angeles. "Here is a potential problem and they are fixing the machine for you. They have not done this in the past."

The company expects to make the shipping arrangements through its network of dealers, who will receive more information about the process in the next 30 days, an IBM representative said.

The machine was introduced in March 1991, but the short-circuit problem has been reported only recently. IBM sharply lowered the price on the 1,405X at least twice over the last 12 to 18 months and stopped making the system in February.

An IBM representative did not know why complaints had not surfaced sooner.

Hewlett-Packard OmniBook 300

- 3.3-volt AMD 386SX/3 processor
- Full-size keyboard
- 2.2 pounds
- Pop-out pointing device
- Multiple PCMCIA sockets
- Battery life of 5 hours or more
- Infrared communications link
- Options for 10MB flash storage or 40MB Kibby Hardk drive
- DOS, Windows, Word, Excel built in
- Optional Microsoft Mail and Delrina WinFax

REVIEWS / TEST DRIVES

First Look / Kevin Strehlo

Ecco puts everything in its place with outlining format

I'm actually putting my life into Ecco—that's how compelling it is as a way to organize the tangle of interrelated people, phone calls, projects, tasks, meetings, and appointments that is my professional life. I'm using it now even though the product is still in beta. I'm doing it even though the version that will handle group schedules is six months away. Yes, I'm even willing to copy my schedule over to the shared desktop resource daily if it means I can use Ecco.

Why? Because Arabesque Software Inc. has created an incredible interface that absolutely, positively urges you to tie the information together in just the ways you need to view it.

AN EXAMPLE. Say a call comes in on voice mail—an interesting idea about a possible testing task for an upcoming product comparison. I type the name and number in Ecco's phone book and check the Call column. Later, when I have time to return calls, I open the Call Back folder and see the message. I click on the phone icon to dial the person and begin taking notes on the conversation right there, outlining points along the way.

The task now becomes clearer: I've got to find a programmer if we're going to tackle the task. After hanging up, I edit the outline slightly to reflect my action item and double-click on the ToDo column, which pops up a calendar. I choose a due date, click the Tickler button, and choose to be reminded about the item three days before it's due. Then I drag the conversation/ToDo outline to the appropriate product comparison folder. I do all this without stopping to think because, although Ecco's as crowded with controls as a jet plane's cockpit, everything is easy to find.

The next time I call the person who suggested the task, the outline of our phone call is under the person's name in my phone book, as are all our previous conversations, with the most current listed first. The outline reflects the elaborations I made when I was working on the idea in conjunction with related topics in the project folder. It also includes further details that came up when the outline surfaced as a tickler, and when I actually firmed up everything and marked the task completed.

OUTLINE FOUNDATION. Ecco bolsters the strengths of a good outline with the capability to cross-reference. You can take any outline, or any point from any level in an outline, and place it in an



Ecco folder with related information. Items then appear in all the contexts in which they belong. An item, though stored only once, might appear in folders for a project, that day's tasks, calls to return, etc. Edit the item anywhere and the information changes everywhere.

Ecco also has an elegant form for the phone book. The calendar is smart, and the interface is well designed. I found it fairly easy to designate a specific level of follow-up and ticking support so that I actually did it. Finally, the program is fast. Searching, moving to another view, filtering out items, collapsing long outlines, and everything else I've tried in Ecco happens in a snap.

EVEN THE GIZMOS. At first I thought Arabesque had overloaded its product with features I'd never use, such as Shooter. However, now I'm wondering if there is any excess baggage. I've already found myself using Shooter, which lets you select text in any application and slide it into an Ecco outline without returning to the program.

TEMPLATES. Ecco includes templates for various areas of work: time management, legal, project management, sales, and research.

Without the templates, Ecco would be as bewildering as Agenda was before Lotus realized (too late to save the product) that the program was so flexible that users needed guidance. Ecco's templates are similar to Agenda's, but they're more flexible, because an outline can organize any kind of information, while Agenda's strengths lay solely in cross-referencing.

I chose the Time Management template, which includes outlines of how to use various features, and before long I was flying solo. True, I was still exploring and pushing buttons that did the equivalent of making the wings fall off, but that's what Undo is for. Soon I wanted a way to jettison the excess baggage (fictional characters, tasks, and appointments) from the template. I hope Arabesque will make it easy to dump the sample data before the final product ships.

IMITATION. You couldn't possibly achieve what Ecco achieves with a slavish imitation of a paper-based time-management product. This is an original program, folks. On the other hand, when you print out your calendar or your phone book, Ecco conforms to the useful, time-proven formats required by Day-Timer and Franklin binders.

I have a few quibbles with Ecco. For example, every other PIM I've used has let me paste the text from an E-mail message as a "note" or some similar attachment to an appointment or task. The closest Ecco comes to this is letting me store the note in Windows' Notepad and embed the newly created file as an OLE object in an outline. On the other hand, maybe I'll just shoot the E-mail nuggets back into my calendar and be that much more efficient for it.

Ecco will retail for \$99 in the first 99 days after it ships in June. After that the price goes up to \$395.

Arabesque Software, in Bellevue, Wash., can be reached at (206) 869-9600.

Kevin Strehlo is InfoWorld's executive editor of reviews and testing. First Look examines new products before they have been formally reviewed.

STATISTICS SOFTWARE



New to Statgraphics Plus 6.0 are on-screen editing toolbox and bit-mapped and PostScript font support.

Overhauled Statgraphics still lags in user interface

BY ALAN J. FRIDLUND
REVIEW BOARD

Among PC statistical packages, Statgraphics, from Manugistics Inc., has always been one of the most sophisticated, yet one of the easiest to learn. This program led the statistics pack in providing menus rather than esoteric commands, and it contained unique technical and mathematical functions that made it ideal for industrial and engineering users. Unfortunately, Statgraphics has always been plagued by very limited data capacity.

Statgraphics Plus 6.0 is a major upgrade that solves the memory problem, adds some long-needed features, and retains the program's technical prowess. This is a must-have upgrade for existing Statgraphics users. But despite the overhaul, it still lags behind in user interface and graphics capabilities.

You will immediately notice the changes to Statgraphics. The old bounce-bar menus are optional. They have been supplanted by pull-down menus that look standard but operate idiosyncratically; the menu choices don't use the Alt key, and submenus always appear as you pan through the main menu options. When the menus start to get in the way, a macro facility lets you record your keystrokes so you can glide through many program steps at once.

Statgraphics Plus offers perhaps the widest range of standard analyses of any PC statistical package. These include such descriptive statistics as cross-tabulation and histogram, and exploratory graphics such as box and stem-and-leaf plots. Analyses extend to nonparametric

tests, correlation, regression, variance analysis, and an array of multivariate analyses. You supply the data for these analyses either via the keyboard or by importing ASCII, Lotus 1-2-3 and Symphony, dBase, dBase, or Atlas Graphics files. (You can export to these formats as well.)

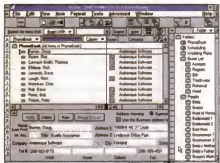
Statgraphics Plus' graphics are similarly varied: bar and pie charts; histograms; exploratory and icon (e.g., sun-ray and star-sym) plots; x, y and x, y, z scatterplots; contour plots; scatterplot matrices; and time-series plots. Version 6.0 includes a new on-screen graphics editing

You will immediately notice the changes to Statgraphics.

toolbox, but it's primitive. If you want to change your graph, the program shuttles you back to text mode, where you type in the changes and the program redraws the entire graph.

On the plus side, though, are the solidity and accuracy of Statgraphics' procedures and its unique math capabilities. Also, Statgraphics is written in a programming language (APL), and Manugistics—which itself makes APL products—gives you many of Statgraphics' math operations, so you can build your own analyses from scratch. Statgraphics Plus lists for \$1,595.

Manugistics, in Rockville, Md., can be reached at (800) 592-0050 or (301) 984-5123.



Ecco makes it easy to organize the daily web of calls, projects, and meetings.

WINDOWS REPORT WRITER

CA-RET/Xbase report developer has potential

BY MAURICE FRANK REVIEW BOARD

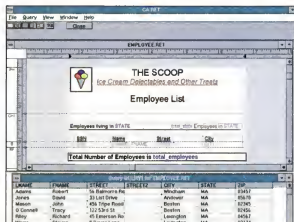
Computer Associates International Inc. helps developers and end-users who need to develop reports from database files will turn to CA-RET/Xbase. Like R&R for Windows, from Concentric Data Systems, and Crystal Reports, from Crystal Services, CA-RET (Report Engine Technology) runs under Windows and works with Xbase files. (For test drives of R&R and Crystal, see May 17, page 106 and May 24, page 172, respectively.)

CA-RET/Xbase, Version 1.0 handles II, III, III Plus, and IV-compatible data, index, and memo files. The program reads Clipper indexes but does not support FoxPro's unique index and memo file. CA-RET also runs commercial text files. Like the products we looked at in previous issues, CA-RET covers the reporting basics and can prepare reports in a variety of formats.

CA-RET is probably more accessible to end-users than the other two products.

Building a report in CA-RET involves

two sets of activities: defining the query that selects data and formatting the report layout. When you start a new report, you must choose either dBase or dBase and specify the files and fields to use. You can also specify other aspects of the query or come back to them later. After you select the data source, a dialog appears offering five kinds of report layouts: tabular, form (vertical), form letter, labels, and freestyle. CA-RET automatically arranges the fields for most of these layouts, so you can change them.



CA-RET can display graphics in reports as well as browse query results while designing the report.

The query builder in CA-RET uses dialogs to obtain table and column names, link fields, select criteria, and sort orders. The program displays the SQL code for the query on demand. CA-RET can also

browse the data returned by the query while you design the report, a useful feature not offered by R&R or Crystal.

CA-RET has the capability to open multiple windows for different reports and data sets.

CA-RET is visually appealing because it displays fields in blue and has grid lines to delineate lines and columns. However, CA-RET's user interface is not always superior. It labels the left border of a report band with cryptic names such as (page header) or GHI (group header level 1). R&R spells out band names and places the field name on group header and footer bands. Crystal lets you choose either method.

You can add BMP graphic files to page headers or footers, but CA-RET can't print a different graphic for each page. CA-RET needs at least one major upgrade, maybe two, before it reaches its full potential.

CA-RET/Xbase lists for \$295.

Computer Associates International Inc., based in Islandia, N.Y., can be reached at (800) 225-5224 or (516) 342-5224.

MACINTOSH DIAGNOSTIC UTILITY

Snooper stands out from the crowd of plain-looking diagnostic utilities

BY JEFF ANOUS REVIEW BOARD

Most diagnostic utility packages look alike, and if the one you're designing by the name of an electrical engineer. The programs and documentation usually appear tidy, terse, and fairly dull.

Snooper 2.0, a recent Macintosh diagnostic utility release, breaks that mold with a colorful but logical interface and frequent documentation. And it works. The hard-core product is a thorough diagnostic tool for Macs. (The vendor recently released Version 2.04, which includes information on the latest Apple releases, such as the Color Classic and PowerBook 165c.) Snooper provides testing and analysis areas for the system software, hard disk, video, video components, and audio equipment.

The program's clean design dispenses with the malady I call "Tellerism" (because a program has the capability to test a component, it's included in the product even if it's irrelevant). Moreover, Snooper's documentation takes snide potshots at diagnostic products that suf-

fer from Tellerism ("We prefer to use the space in Snooper for things that really test something") and at the mostly useless "help" files that haunt such users.

Snooper does just tell you that a component has failed a test; it usually offers a possible fix for the problem and whether it's really a task for a trained technician or something you can try yourself. Although this is a valuable approach, Snooper does not refer consistently to the same place for solutions. Sometimes Snooper proposes the solution in a dialog box and other times in the documentation.

In the system board testing area, called Logic Tests, Snooper recognizes which Mac model you are working on and shows a fairly accurate image of your particular system board. As your mouse cursor hovers over the board image, a help area displays text describing the underlying component's name and function. The on-line help also includes descriptions for system and "Sad Mac" errors. However, this same information cannot be found in the hard copy documentation, nor can you print it out.

Snooper features the usual logging and reporting capabilities, useful for tracking maintenance schedules and previous conditions. Unless you're an electrical engineer, I recommend checking out Snooper. At \$249, it costs more than many diagnostic utilities, but the program is a class act.

Maca, in Glendale, Calif., can be reached at (800) 788-6292.



With Logic Tests, Snooper can tell which Mac machine you are using and display your system board.

COLOR MONITOR

Sight for sore eyes: NEC bolsters monitor features, reduces prices

BY MARK GLASER

ASSISTANT REVIEWS EDITOR

Monitors have begun to follow the trend of the recent PC price wars — you can get more for your money if you wait. And as the prices of larger color monitors plummet, more people are looking at 17-inch monitors for general office use.

With this in mind, I took a long, hard look (fill my eyes were sore) at the latest offering from one of the market leaders, NEC Technologies Inc. Its 5F5G is part of the revamped MultiSync line — the "e" signifying extended refresh rates and broader scan ranges.

The first thing I noticed going from my old NEC 15-inch 4FG to the larger 17-inch 5F5G was the available space for opening up multiple windows. I could easily work between three applications, whereas two applications was stretching it on the 15-inch screen. As an editor, I appreciated seeing more text on-screen without having to scroll through documents; as a user of graphics programs, I appreciated the elbow room for images.

And I haven't even mentioned the sharp colors. My graphics were always crisp, and I never experienced flicker or color bleeding — the death knell for any monitor. The 5F5G supports up to 1,024 by 768 graphics monitored at a 76-hertz vertical refresh rate (up from 72 hertz on the old FG line).

The only glaring problem I had was the glare. The polished cathode ray tube caused a lot of reflection in my fluorescent-lit office. However, with the optional anti-glare screen (\$70 extra) in place, the glare was cut down considerably. The tempered glass filters use High-Efficient

Anti-reflective coating, an adaptation of the treatment used on the windows of spacecraft. (No, you don't get a bottle of Teflon with each lens.)

Also available from NEC are two 15-inch models, the 3F5G and 4F5G. The former only supports 60 hertz in noninterlaced, 1,024-by-768 resolution and lacks digital controls. The 4F5G supports 76 hertz and includes AccuColor color adjustments (which are strangely missing on the 5F5G).

As on the old FG series, all three "e"

My graphics were always crisp, and there was no flicker.

models feature FullScan, enabling the user to display bezel-to-bezel images, increasing the active display area. Also, all new models comply with the maximum video terminal radiation (MPR II) low-emissions standard and support XGA and XGA-2 graphics modes.

But the kicker is the price. The 3F5G's estimated list price is \$249. The 4F5G is \$285, and the 5F5G is \$1,155 — all very affordable for the high quality of their pictures. In addition, NEC offers a three-year warranty on all models.

By bringing prices down and improving features, NEC has made a solid value even more eye-catching.

NEC is located in Wood Dale, Ill., and can be reached at (800) 388-8888; fax: (800) 366-0476.

Goodnight won't let downsizing make a statistic of SAS

Computers have been messed up ever since they invented operating systems. So says Jim Goodnight, president and cofounder of the SAS Institute, who programmed IBM 1620 mainframes in college. Today, the company that followed the rise of mainframes in organizations is trying to broaden its product line. In the SAS view of client/server computing, there will be an SAS product for every client or server option out there.

That means trying to work with a lot of operating systems: Windows, Windows NT, OS/2, Unix, and even the Macintosh. And it means adding more graphical elements to the statistical package's number crunching. Editor at large Scott Mac spoke with Goodnight about the changes at SAS.

InfoWorld: What is SAS doing to address the needs of mainstream business computer users?

Goodnight: We're trying to provide the software that mainstream corporations can use, and use it over whatever hardware platforms and operating systems that they have in place. As part of our client/server strategy, we want to allow a corporation to tap into whatever resources it has with the SAS system.

InfoWorld: Are you really a player in the PC software market?

Goodnight: We have a large number of PC users. Revenues from our PC software sales are somewhere around \$50 million a year. Each year we're getting more and more of our revenues from desktop sales. And eventually I hope it's about half and half — half mainframe

and half desktop software sales.

InfoWorld: You announced recently a geographic information system based on the SAS system. Traditionally the cost of GIS data has been very high, but there seems to be some sort of price pressure now in that area. How do you see GIS pricing?

Goodnight: Well I figure that as taxpayers, we've already paid for it once. Why should we have to pay for it again?

InfoWorld: You have said that the mainframe is not dead. Do you see any indication that any of your customers are interested in turning off any mainframes?

Goodnight: No. The ones that have mainframes will have them for years and years, mainly because the applications that are already developed there are running successfully. It's a lot of work to move major applications off of the mainframe onto workstations. We spent about three months of work to get everything ironed out so that a single application could be moved over to a server.

InfoWorld: You announced recently SAS systems for NT and a collection of Unix environments. How important will it be to your customers?

Goodnight: Well I think NT is just a natural progression of operating systems, and a number of our users will move to it. It's a 32-bit operating system, while the current Windows 3.1 environment is 16-bit. So, 32-bit operating systems just run better.



Jim Goodnight

President
SAS Institute
Cary, N.C.
Age: 50

InfoWorld: I detect that the 16-bit Windows project was a struggle.

Goodnight: It was extremely difficult. We would have never been able to get SAS running under Windows if it were not for OS/2. We basically developed it under OS/2 and then moved it over to Windows.

Every time you turn around with Windows in a development environment, the machine falls over dead. So it

is not at all a pleasant environment to be involved in working in.

InfoWorld: Was the 16-bit OS/2 a mis take?

Goodnight: IBM should have gone to the 32-bit version of OS/2 right away and been done with it. But somehow I felt it could milk the customers by making them all convert to a 16-bit and then convert them later to a 32-bit.

InfoWorld: You seem to feel this can go on. It has to change?

Goodnight: Oh I certainly think a lot of IS managers are tired of having to do the constant upgrades for different things. Take Microsoft: The company should just put Windows NT out and leave Windows alone. But no — Microsoft will probably do a Windows 4 and a Windows 5 and a DOS 7 and a DOS 8. It will go on and on — mixing up and changing what Windows sits on top of DOS and how much DOS is part of Windows. It's very confusing, especially for third-party vendors like ourselves, to try to keep pace with the constant upgrade strategy that Microsoft uses to generate revenue.

InfoWorld: Do you feel you can lead a crusade for some change?

Goodnight: I don't really think about things like that! What we try to do is be there when our customers need us to be there with our software. And if Microsoft is pursuing the strategy that they're pursuing, then we will try to get SAS operating on the environments that our users want us to operate on.

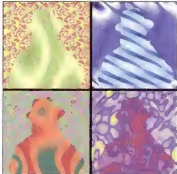
Notes From the Field / Robert X. Cringely

Did you hear the one about cc:Mail for Windows 2.0 shipping this year?

Microsoft has a new distribution method for Windows NT. I got an E-mail message last week. "Within 60 days you will receive a letter from Redmond containing a list of names and addresses, along with instructions to write 10 lines of C code and send them to the address at the top of the list. Add your name to the bottom and mail copies to 84 of your friends. In a few weeks you will receive 12.5 million lines of NT source code, ready for compiling and linking.

"Do not break the chain. One beta tester forgot to mail his source code and lost the system to a power surge. Another sent the letter back to Microsoft and was soon in a mental hospital, endlessly repeating the word *downsizing*."

WHO'S A SAP? That's not a great joke, but it's not a bad one, either. Here's a bad joke: Microsoft was James Plamondon set out on May 5 on an officially sanctioned quest for a nasty joke about Amber. Apple's document imaging architecture that competes with Redmond's Compound Document Management standard. "If we can make the name a running joke in the industry," he wrote in an E-mail broadcast to his



Microsoft cohorts, "then few will take the technology seriously."

Rubish.

The winning entry came from Cameron Myhrvold, who said that Amber is "petrified tree sap in which Apple will forever preserve its bugs." Weak.

REMOTE POSSIBILITIES. Not that Microsoft doesn't have some technical merit to tout. The Windows for Workgroups 3.11 beta went out last week, for example, and looks very good. New features include an MS-DOS server (286 stations

that can't run Windows can now act as FWF servers), enhanced security, 32-bit disk caching, and lots of new drivers. The part I like best is built-in remote access. Not only can you dial in to the LAN through a modem, but you can connect your notebook through the serial port on your desktop PC, rather than by using an expensive LAN adapter.

BAD NEWS. "Jokes are a waste of time," Pammy said, her blood sugar dropping in the moist Atlanta heat, balanced by a rise in her crankiness coefficient.

"You only say that because you can never remember jokes."

"You're aren't worth remembering." Comdex attendees were the brunt of a few jokes last week, though they may not have known it at the time. Lotus was showing cc:Mail for Windows 2.0 which they said will ship in June. Wrong! It will be early 1994 for this overambitious release is ready.

A close look at Microsoft's Win32 software catalog, distributed at the show, reveals a few products that will never exist. KnowledgeWare's AccessPoint, for one, is long dead.

A company near death is Sitka. Folded into SunSelect a while back, the net-

working company is being dismembered and its OpenTOPS and pen-based products all have been cancelled.

MILLIONS SIGN NDA. This week Apple will finally roll out its Newton hand-held at the Consumer Electronics Show in Chicago. General Magic was supposed to have done its gala product intro at the same show but didn't quite make it.

There is still a way to see GM technology in action, though. Fly to England and watch the June 7 Horizon episode on BBC-TV to see a product demo that could not be cancelled.

"I tell great jokes!" I protested. "Ray Noorda of Novell dies, goes to Heaven and walks past a big house with the initials BG on the front gate."

"That can't be Bill Gates' house," Noorda said. "He's too young to be dead."

"Actually, that's God's house," Si Peter said. "But sometimes he thinks he's Bill Gates."

"I don't get it," Pammy said.

She wouldn't. But I'd love to get some industry secrets. Call me at (415) 312-0555; fax at (415) 358-1269; MCI: CRINGE, or cringe@infoworld.com.